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BIOGRAPHICAL SKETCH OF CHARLES MARSHALL,

First President of the Philadelphia College of Pharmacy.

Read at the Meeting of the College, March, 1865.

BY DILLWYN PARRISH.

Charles Marshall, the first President of the Philadelphia College of Pharmacy, was born in Philadelphia on the 8th day of 5th month, 1744, and died on the 22d day of 8th month, 1825, aged about 81 years.

His father, Christopher Marshall, opened a drug and chemical store about the middle of the last century, on the south side of Chestnut, above Second street, Philadelphia. His business was conducted in a two-storied building, with a projecting roof, from which was suspended a large gilded ball, the sign by which his store was designated. One of the newspapers of that period informs the public that a choice assortment of fresh teas had been added to the stock of drugs and medicines. His son and successor, Charles Marshall, received his pharmaceutical education in this establishment. He is said to have possessed a fine literary taste, and, before entering upon his apprenticeship, was well instructed, not only in the usual branches of an English education, as then taught in the best schools, but also in the Latin and Greek languages.

On attaining his majority, Charles Marshall entered into partnership with his father and elder brother, and, on their retirement from the business, became sole proprietor. Unlike the pharmacists of the present day, who receive a large proportion of their remedies in a finished state from the extensive laboratories which now abound, it was necessary for him to be

both botanist and chemist, and to superintend the preparation and manufacture of most of the remedies then in use. For this department he had a remarkable aptitude, and his skill and integrity contributed largely to the reputation of the establishment.

In the early part of the present century, after a long career of usefulness and prosperity, he retired from the active duties of business, and resigned it to his son and successor, (afterwards a member of this College,) and having acquired an ample competence, he entered upon the enjoyment of those literary and domestic tastes which were so congenial to him.

By the concurrent testimony of his contemporaries, he possessed scrupulous probity of character, combined with great urbanity of manners. He was beloved by a large circle of friends, and his house was the abode of refinement and hospitality. In this connection we may remember the testimony of one of our colleagues, who, near the close of life, in recurring to the family of Marshall's, with whom he had served his apprenticeship, made the assertion that "few nobler men ever lived than Charles Marshall."

We cannot better describe his personal appearance than in the language of one who knew him long and intimately in the domestic circle:

"In stature, Charles Marshall was about six feet high, of slender mould, clear complexion, blue eyes, and graced with a benignant expression of countenance, heightened in its effect towards the close of life by the snowy whiteness of his hair, which, in ample volume, descended nearly to his shoulders. His costume was uniformly plain, and equally uniform in color, being the drab then in vogue with the Society of Friends, of which he was a consistent and life-long member."

A few years after his retirement from active business, the establishment with which his name had been for many years associated, loaned the endorsement of the firm to a large amount, and involved all connected with it in bankruptcy. The senior partner, who was entirely ignorant of these proceedings, was then in advanced life; but he met the shock with fortitude, and without hesitation gave up his property for the benefit of the creditors.

It may seem unnecessary to revive this painful portion of the history, but it is done that it may prove a beacon to those who may be similarly circumstanced.

This sad occurrence made it necessary to change his manner of life, and in 1804 it was concluded that his daughter Elizabeth, a lady of singular good sense, and varied attainments, should open a store and conduct the business of a pharmaceutist, with the aid of her father. The small front parlor of their dwelling (then 56 Chestnut street, opposite Strawberry alley,) was appropriated to this purpose. Many of the leading physicians and citizens, sympathizing with the calamity, and knowing the worth and integrity of the venerable Charles Marshall, lent their influence to promote these laudable endeavors. The gradual, but sure extension of the business followed. The little front parlor, with its small stock of medicines, was made to expand its dimensions, to meet the demands of its customers; the back buildings were extended, and taken into the store on Chestnut street; an ice house and laboratory were added to the establishment, as also a wholesale warehouse, from whose ample stores many country physicians and storekeepers obtained their supplies of genuine drugs and medicines; a number of apprentices and assistants, varying from six to twelve, were constantly employed. The maiden pharmaceutist presided with dignity and skill, and, under her judicious management, restored to her family a liberal competence. This excellent woman departed this life on the 26th day of 6th month, 1836.

She continued the business till the year 1825, when she withdrew, leaving it in the hands of two of the former apprentices—"Ellis & Morris,"—afterwards Charles Ellis & Co., the former the present presiding officer of our College.

The establishment at 56 Chestnut street was always renowned for the extent and integrity of its transactions. I have been unable to ascertain how many members of this College (in the past and present) have received their pharmaceutical education within its walls, but it has certainly contributed a large number to our ranks. Some of these still survive, and cherish with pleasant and grateful recollections, the time spent in acquiring a knowledge of their profession.

When the University of Pennsylvania assumed to issue diplomas to practitioners of pharmacy, and to prescribe the conditions of the grant, the pharmaceutists of Philadelphia felt it to be an infringement of their rights, and established this College in 1824; and it is a proof of their appreciation of the character of Charles Marshall, that he was unanimously elected their first President. Though far advanced in years, and unable to take an active part in its proceedings, the measure had his full support and encouragement.

BIOGRAPHICAL SKETCH OF HENRY TROTH,

Late Vice-President of the Philadelphia College of Pharmacy.

Read at the meeting of the College, September, 1865.

Henry Troth was born in Talbot County, Maryland, Ninth month (September) 4th, 1794, being descended from William Troth, who settled under the humane and tolerant administration of Lord Baltimore, in 1685. The boyhood of Henry Troth was chiefly spent on a farm distant from any school, and at about the age of 14 he accompanied a near relative to Tioga County, Pennsylvania, then known as the "backwoods," where he spent two years in pursuit of deer, wild turkey and other game, with the occasional experience of a farmer's life.

He then came to Philadelphia to seek his fortunes, and entered with Jeremiah Morris, Druggist and Apothecary, on the north side of Market below 8th street. He was an inmate of the family of his employer, and his only assistant. His master was esteemed a superior man, but had no taste for the drudgery of the shop, as illustrating which, Henry used to relate that, on one occasion, he obtained leave of absence to visit his family in Maryland, in that day a tedious journey by stage, on condition that he should leave an ample supply of salts, senna and manna, magnesia, cream of tartar, and so forth, all ready folded in "fipenny-bit packages," that his master might dispatch business without so often soiling his hands. Human nature seems to carry very similar traits through generations, as they pass.

Henry Troth was both an industrious and a studious youth, and he made the best of the few useful and interesting books

then accessible ; these he would buy at auction, and when their contents were mastered would have them sold again, sometimes at a profit.

Before his apprenticeship was over he obtained a release from his worthy master, to enable him to enter business on his own account with a relative willing to advance the necessary capital for a small beginning. This was at the close of the war of 1812, when those who embarked in business with large outlays mostly came to an end in a few years ; but the young firm, by "making two dollars and spending only one," soon established the business on a firm basis and prospered.

Previous to the establishment of this College in 1821, Henry Troth was strongly impressed with the availability of such an organization, and to his untiring energy and devotion to its interests the successful establishment and maintenance of the institution was for some years mainly due. He was remarkable for the punctuality and steadiness of his attendance of its meetings and that of its Board of Trustees, over which he presided for many years.

His public spirit was manifested in many other useful institutions. In the Apprentices' Library he was one of the most efficient members, from its establishment to the time of his death, every page of its history exhibiting his efficiency and zeal in promoting the improvement and happiness of apprentices, of whose needs and wants he had a lively sense.

The same generous impulses led him to become an efficient Manager of the House of Refuge for juvenile delinquents. He served for many years on the Committee to find homes for such of the inmates as were sufficiently reformed to bind out as apprentices, to the country.

When about 28 years of age, Henry Troth became, by the choice of the people, a member of the Common Council of Philadelphia, over which body he was afterwards chosen to preside. He was one of the first to advocate the introduction of gas for lighting the city, an improvement which met with persevering opposition from those who apprehended numerous dangers and disasters as inevitable. He was among the first to introduce the use of coal as a fuel, and many persons took his grates as a pat-

tern for the construction of this afterwards popular means of warming apartments. As early as 1826 he became a Manager of the Schuylkill Navigation Company, and during 16 years that he was connected with it, saw the transportation of anthracite coal increase from 35,000 tons, in 1825, to 953,899 tons in 1841, while in 1864 it reached nearly ten millions of tons.

In conclusion, we may appropriately refer to our late Vice-President, not only as a man of thorough integrity and uprightness, but as illustrating in his example how a successful business man, devoted zealously to his own interests, may at the same time be instrumental in developing and promoting the interests of his fellow men, and, by bringing all his powers into activity, may accomplish a work in the world which will cause him to be regarded as an example of energy and philanthropy.

ON ARNICA PLASTER.

BY FREDERICK C. ORTH.

The preparations of arnica flowers are receiving and rapidly gaining favor with the medical profession, being highly extolled in domestic practice as a most useful, popular and efficacious remedy, applied to sprains, bruises and rheumatic affections generally.

The forms usually employed are the tincture and plaster; both these preparations, as well as an alcoholic extract (solid) have been introduced into the last edition of the *Pharmacopœia*.

In accordance with the suggestion of our Professor of Pharmacy, the subject of the preparation of arnica plaster has been adopted. Previous to making the plaster several extracts were prepared, with the view of ascertaining the quantity of extract respectively yielded by several processes. The first was prepared according to the formula given in the *United States Pharmacopœia*, as follows: Take of

Arnica flowers, in moderately fine powder, 24 troyounces.

Alcohol, 4 pints.

Water, 2 pints.

Diluted alcohol a sufficient quantity.

Mix the alcohol and water and moisten the powder with a pint of the mixture; then pack it firm in a cylindrical percolator, and gradually pour on the remainder of the mixture. Continue the percolation with diluted alcohol until six pints of tincture have passed. Lastly, evaporate this by means of a water-bath to the proper consistence.

This process yielded 20 per cent. of the extract. In making the second extract I have been guided by the formula given by Prof. Procter, in the Amer. Jour. of Pharmacy, iii. series, vol. iii. No. vi., as follows:

Arnica flowers, twelve troyounces.

Alcohol, three pints.

Water, one pint.

Mix the alcohol and water, and pour two pints of the mixture over the arnica, previously finely bruised. Allow it to stand for 48 hours, pack it firmly in a percolator, and pour on the remainder of the mixture until three pints are obtained. Evaporate this tincture in a water-bath (or still) till reduced to a soft resinous extract.

This extract I evaporated still further, in order to obtain it, as near as possible, of the same consistence as the preceding.

The yield of this process was 16 per cent. or 4 per cent. less than the officinal. But whether the 20 per cent. of the officinal process is of more medicinal value than the 16 per cent. of Prof. Procter's process, I am unable to say at present.

I will now proceed to the preparation of the plaster.

Plaster No. I. was prepared according to the officinal formula, as follows: Take of

Alcoholic extract of arnica a troyounce and a half.

Resin plaster, three troyounces.

Add the extract to the plaster, previously melted by means of a water-bath, and mix them.

The plaster thus prepared has a deep yellowish-brown color and is adhesive, spreads readily, though somewhat soft, more so than desirable at the temperature of the skin.

Plaster No. II. was made by taking of alcoholic extract of arnica, a troyounce; resin plaster, two troyounces; Burgundy

pitch half a troyounce. Melt the resin plaster and pitch together in a water-bath, add the extract and mix thoroughly.

This plaster is uniform in texture, spreading quite as readily as the preceding, and is of a more desirable consistence.

Plaster No. III. was prepared from the unofficinal extract, by taking the same proportions and making in the same manner as the officinal. This plaster spreads readily, but the same objection exists as in the officinal or No. I., it being too soft at the temperature of the skin.

Plaster No. IV. The proportions in this plaster vary from the officinal, to wit: Take of the

Alcoholic extract of arnica a troyounce.

Resin plaster three troyounces.

Made as the preceding. Its general properties are the same as Plaster No. I., only lighter in color.

Plaster No. V. This differs from the preceding and is suggested for reasons which will be herein stated. The following is the formula: Take of

Alcoholic extract of arnica, a troyounce.

Resin plaster, two troyounces.

Burgundy pitch, 120 grains.

Cerate of Cantharides, 180 grains.

Melt the plaster and pitch together in a water-bath, and add the extract; finally add the cerate and mix.

This plaster presents much the same appearance as Plaster No. II., spreads as readily and has the same consistence. In some cases this may be preferable to the ordinary arnica plaster, it being of a more decided rubefacient character and yet not containing sufficient cantharidis to produce vesication.

From the foregoing experiments I discovered that the addition of Burgundy pitch, in the proportion given in the formula for Plaster No. II., forms a very adhesive as well as a consistent plaster, and I think will give satisfaction to both physician and patient who may have occasion to prescribe and use the arnica plaster.

In concluding my essay, I was in the hope of presenting the opinion and experience of several physicians of our city, to whom

I gave plasters made of the results of my experiments, to test their quality and virtues; but I regret that I have been unable to report them in consequence of their not having had cases where the application of the arnica plaster was called for, or would have been judicious.

Philadelphia, January, 1865.

PHARMACEUTICAL NOTICES.

BY GEORGE A. GROSS.

Tinctura Opii.

Owing to the greatly increased price of alcohol, it occurred to me that a preparation of opium, containing all the desirable properties of the drug, and containing only half as much alcohol as the officinal tincture, or just sufficient to act as a preservative agent, would be desirable to the pharmacist.

With this view, Oij. tr. opii were prepared in the following manner: The opium was first grated fine, put into a vessel, hot water poured over it, and allowed to macerate for twelve hours. It was then transferred to a percolator and treated with water until Oiss. had passed. The percolation was necessarily very slow. After this quantity of liquor was obtained, half a pint of alcohol, sp. gr. .835, was added, and the whole filtered. The result was a clear tincture, not quite as dark colored as the officinal, but possessing all the desirable qualities of that preparation.

The dregs were carefully tested for morphia, &c., but no traces could be discovered.

It is thought a tincture made in this way would be preferable to one made by the officinal formula, as it contains none of that disagreeable resino-extractive which is dissolved out of the opium by the alcohol, and which is of no value in the preparation, but rather an objection to it. This tincture would also be less stimulating, as it contains less alcohol, although, as the dose is so small, this circumstance would not be of much importance alone, but combining this fact with the absence of the resin, (which renders the officinal tincture so extremely disagreeable, the taste being retained in the mouth long after it has been taken), the conclusion

is that it would be preferred by physicians; and it certainly would be a much more profitable preparation to the pharmacist. The darker color of the officinal tincture is owing to the greater solubility of the coloring matter in alcohol than in water, and consequently it is not all taken from the opium when water only is used as a menstruum.*

Tinctura Opii Camphorata.

My attention was first directed to this preparation by the frequent complaints of physicians, and other customers, about its cloudy appearance in cold weather, in consequence of the diminished solvent power of diluted alcohol for oil of anise and camphor at a low temperature.

As the design of paregoric as a remedial agent precluded the use of strong alcohol, I deemed it unadvisable to employ a stronger menstruum. Oij. of the tincture were prepared with the ingredients directed by the U. S. P., and to insure the complete solution of the oil of anise, I rubbed it up with finely powdered pumice stone, then added the camphor and benzoic acid. After thoroughly mixing the whole together it was filtered. When prepared in this manner it contained much more oil of anise, but a reduced temperature affected it the same as when prepared in the usual manner.

I then varied the process by mixing all the water and half the alcohol together with all the ingredients excepting the camphor and oil, which were rubbed up with powdered pumice stone, as before, and then mixed with the menstruum, as before stated. After filtration, one-fourth part of the remaining alcohol was poured upon the filter, and the remaining three fourths added to the filtered tincture, which rendered it perfectly clear.

[* Laudanum prepared in this way was recommended as early as 1846 by the late Aug. Duhamel, with the alcoholic strength of the U. S. P., and subsequently by Mr. Dupuy, of New York, of the strength indicated above, (see U. S. Disp. Note to Tr. Opii). We object to the use of boiling water on account of the bassorin-like matter of the opium being taken up. Laudanum prepared in this way does not represent officinal laudanum. Those who may want to avoid the ingredients dissolved by alcohol have the deodorized tincture of the Pharmacopœia. In any case we believe this should not be substituted for the officinal laudanum without notice.—ED. AM. JOUR. PHARM.]

Thus prepared, the tincture contained fully as much oil as when prepared by the process of the U. S. P., and withstood a much greater degree of cold. At the temperature of 40° the officinal tincture was rendered quite opaque, while this retained its transparency. It also formed transparent mixtures with syr. squills and syr. ipecac.

Carb. magnesia was afterward substituted as an agent for dividing the oil, and was found to answer the purpose perfectly. The alcohol used was of sp. gr. .835.

By substituting the following process for the officinal formula, pharmacists would obtain a preparation which would be much more satisfactory to all parties interested:

Opium,	} aa.	grs. Ix.
Benzoic acid,		grs. xl.
Camphor,		grs. xli.
Ol. Anisi,		ffij.
Honey,		3ij.
Water,	} Oj.	
Alcohol aa.		
Powd. pumice, very fine,		3ss.
Carb. of magnesia,		grs. cxx.

Macerate the opium with the water and Oss. alcohol for seven days and filter through paper. To this add the honey and mix thoroughly. Rub the camphor with a little alcohol until it becomes pasty, then add the powdered pumice stone, and triturate them well together, adding the oil and acid. Mix thoroughly, and add the honey and opium mixture. Then filter, and when all has passed through, wash the filter with two ounces alcohol, and, after it has passed, add the remaining six ounces of alcohol to the filtered liquid. When carb. magnesia is used, the acid should be dissolved in the six ounces of alcohol which is added finally. When it is to be prepared quickly, the equivalent proportion of tr. opii may be used in place of the opium.

Extemporaneous dispensing of Ferri Iodidi in Pills and Mixtures.

The greatly increased use of iodide of iron by medical practitioners, renders it desirable to be able to dispense this salt when ordered in a pure state.

Any attempt to do this with the solid salt as furnished to the trade is impossible, as the atmosphere will destroy any specimen, even if it were unaltered when the containing vial is first opened.

I feel the more free to direct the attention of pharmacists to this matter, as it has already been done by Dr. D. F. Wright, of Memphis, Tenn., in the Am. Jour. of Pharmacy for January, 1854, and also by M. Perrens, of France, in March, 1855. The following formula is submitted as the result of experiments with this view :

R. Iodinii,	grs. xl.
Ferri redacti.,	
Acacise pulv. aa.,	grs. x.
Sacchari pulv.,	grs. xx.
Glycerinæ, .	gtt. xv.
Althææ pulv.,	q. s.

To be made into fifty pills.

Triturate the iodine and the iron thoroughly together, dry, until they are reduced to a fine powder ; then add the glycerine, and rub till the fumes of iodine cease to be given off, and the mixture assumes a greenish color.

Then add the powd. acacia and sugar, and lastly sufficient powd. althææ to bring to a pilular consistence.

The mass should be very stiff. When the pills are formed roll them in ferri pulv., and then coat them with tolu, as directed by the U. S. P.

This formula is not offered with a view to supersede that of the U. S. P., but as one which will do very well when iodide of iron is prescribed, combined with extracts, &c. ; or when the simple pil. ferri iodidi are ordered, and sufficient time is not given to prepare them by the officinal formula. When prepared in this way they are quite permanent.

But efficient as may be the formula here given, it may be objected to upon the ground that some portion of the iodine may escape combination, as we have not the same means of knowing that it is all combined that we have when prepared by the officinal process. Yet to be controlled in the size of pills, and unable to combine other remedies indicated by the disease is so annoying, that I have thought it best to recommend a syrup containing

25 per cent. of the solid salt, which can be added to any remedies not chemically incompatible, and, where pills are ordered, the mass rendered firm by the addition of powd. althææ and gum acacie. In many cases the syrup forms an excellent excipient for the pills, where powders are ordered in combination with iodide of iron.

Oleum Peponis Seminis.

Having seen a sample of this oil, with the history of which I was entirely ignorant, I prepared a small quantity to ascertain the appearance and some of the characteristics of the genuine article. The process adopted was that recommended by Mr. W. B. Tegetmeier, in the May number of the American Journal of Pharmacy for this year, by exhausting the crushed seeds by means of bisulphide of carbon.

The yield was 33½ per cent. of a thick red oil, rather rank taste, little smell, except when rubbed upon the hand, and having sp. gr. .928, at a temperature of 60° F.

Dec. 9, 1864.

GLEANINGS FROM THE FRENCH JOURNALS.

BY THE EDITOR.

Use of kinovic acid in medicine.—E. De Vry. Analysis has proved that this acid exists in the leaves and root wood of the Cinchonas to the extent of 2·57 per cent., and that it has the power of breaking, in a great many cases, pernicious and non-pernicious fevers.

These facts observed on an hundred Dutch soldiers, leaves no room for doubt. It was also tried in diarrhoea and dysentery, with marked success.

M. De Vry thinks, therefore, that it will be possible to collect the leaves of the cinchonas, and prepare a tincture which will serve as a prophylactic against jungle fevers, in localities where they are endemic.

Quinine manufacturers waste considerable quantities of kinovic acid. M. De Vry is certain that the barks of all the plants of the genus *Nauclea*, which abound in the forests of Java, contain notable quantities.—*Jour. de Chim. Med.*

Camphorate of Quinia.—Sr. Vicenzo Frosini Marletta suggests this salt for use in medicine for the same purpose generally than the valerianate of quinia is used; and he believes that the camphorates generally deserve a respectable position in therapeutics.

Camphorate of quinia may be prepared either by saturating an alcoholic solution of camphoric acid with pure quinia in fragments to perfect neutralization, and evaporate to dryness at a temperature below 104° F.

Or it may be prepared by double decomposition between an alcoholic solution of camphorate of lime or potassa, and a solution of neutral sulphate of quinia. The sulphate of lime or potassa precipitates, and the camphorate of quinia remaining in the filtered solution is isolated by slow evaporation in a stove. The salt is given in doses of three-quarters of a grain (0.5 decigram) every half hour. The author prefers to give this salt in combination with antimoniate of quinia: about 5 grains of each salt, made into ten pills with extract of grey cinchona bark, of which one pill is to be given every half hour.—*Bouchard, Report de Pharm., Mai, 1865.*

Agglutinative tissue.—Dr. Fort (*Rep. de Pharm.*,) suggests as a substitute for the English isinglass plaster, a tissue made as follows:

Take of Gum arabic, selected, 5 drachms.

Distilled water, 8 "

Glycerin, a sufficient quantity.

Dissolve the gum in the water, and add sufficient glycerin to render the mucilage of the consistence of syrup. This solution is spread by means of a brush on one side of thin, glazed muslin.

The author suggests this plaster as inodorous, very supple, and as not cracking in winter, owing to the glycerin in its composition. It adheres strongly by simply moistening the surface, and can be easily removed. The author does not say whether it is hygroscopic, or ill adapted for a damp atmosphere.

Preparation of chlorine.—M. Shank replaces the binoxide of manganese used in making chlorine with chromate of lime, obtained economically by calcining chromate of iron (ore) with lime in a current of air. On the addition of hydrochloric acid the

greater part of the chlorine is disengaged without applying heat. The residue treated with water and the solution by milk of lime, gives a mixture of oxide of chrome and lime, which is available for the chrome manufacturers.

ON CHEMISTRY APPLIED TO THE ARTS.

BY DR. F. CRACE CALVERT, F.R.S., F.C.S.

Bones.—Composition of raw and boiled bones. The manufacture of superphosphate of lime. Application to agriculture. Bone-black or char, and their use in sugar refining. *Phosphorus*, its properties, extraction, and employment in manufacture of matches. *Horn* and *ivory*, their composition and applications.

LECTURE I.

I shall not take up your time by making many preliminary remarks, but merely state that though the heads of the subject on which I intend to speak are not inviting ones, still we shall find as we progress that the study of the various matters which I shall bring before you is full of interest and instruction. Further, it would be difficult to name objects which better illustrate the ability of man to turn to profitable account the various materials placed in his hands, or to mention substances which have received more complete and skilful applications than those we shall treat of this evening.

Bones.—The composition of “green bones,” or bones in their natural state, may be considered under two general heads, viz.:—the animal matters, consisting of a substance called ossicine and a few blood-vessels, and the mineral matters, chiefly represented by phosphate of lime and a few other mineral salts. The composition of bones has been examined by many eminent chemists, but the most complete researches are those, published in 1855, by M. Fremy, who examined bones, not only from various classes of vertebrated animals, but also from different parts of the same animal; and to enable you to appreciate some of his conclusions, allow me to draw your attention to the following table:—*

* *Annales de Chimie et Physique*, volume 43, pages 79, 83, 84.

Composition of Bones.

Name of Bone.	Mineral Matter.	Phosphate of Lime.	Phosphate of Magnesia.	Carbonate of Lime.
Femur—Fœtus 6 months	63.0	58.9	5.8
" Boy 18 "	61.6	58.0	.0.5	2.5
" Woman 22 years	60.1	59.4	1.3	7.7
" Man 30 "	63.2	57.7	1.2	9.3
" " 40 "	64.2	56.3	1.3	10.2
" Woman 80 "	64.6	57.1	1.2	7.5
" " 97 "	60.8	51.9	1.3	9.3
" Lion(young)"	64.7	60.0	1.5	6.3
" Sheep.....	70.0	62.9	1.5	7.7
Sperm Whale.....	62.9	51.9	0.5	10.6
Ostrich.....	70.0
Carapace of Turtle.....	64.3	58.0	1.3
Codfish.....	61.3
Stag's horn.....	61.9	58.1	traces	3.8
Cow's tooth Bone.....	67.1	60.7	1.2	2.9
" " Enamel.....	96.9	90.5	traces	2.2
" " Ivory.....	74.8	70.3	1.3	2.2
Scales of the Carp.....	34.2	33.7	traces	1.1

The first conclusion drawn by M. Fremy from these researches is, that he found a higher proportion of mineral matter than is generally admitted by chemists. Secondly, that there is no material difference in the composition of various bones taken from different parts of man, or of any one animal, but that age had a very marked influence on composition. Thus, in the bones of infants there is more animal and less mineral matter than in the adult, whilst in old age there is more mineral and less animal than in the middle-aged man. The mineral substance which chiefly increases in old age is carbonate of lime. Lastly, he could find no marked difference between the bones of man, the ox, calf, elephant, and whale ; whilst in the bones of carnivorous animals and those of birds there is a slight increase in the amount of mineral matter. Allow me now to call your attention to a most interesting query. I hold in one hand the mineral matter only of a bone, which you can see retains perfectly its original form, and in the other hand I have the animal matter only of a similar bone, which also retains the form in which it previously existed, but is flexible instead of rigid. The question, therefore, arises, whether the strength and hardness of bones proceed from these two kinds of matter being combined together, or are their respective molecules merely juxtaposed ? The answer is, the lat-

ter; for, as you see by this specimen, the mineral matter has been entirely removed without deforming the animal texture. Further, in the foetus it is found that the bones contain nearly the same proportions of animal and mineral matters as those of the adult. Also, it has been observed by M. Flourens, and other eminent physiologists, that the wear and tear of bones during life is repaired by the formation of new bone on the exterior surface of the bone, while the old substance is removed through the interior duct, and that the composition of the new layer is the same as that of the original bone. Let us now proceed to examine the chemical properties of the various substances composing bones, and some of the various applications which they receive in arts and manufactures. The general composition of bones may be considered to be as follows:—

BONES.				
Organic Substances	{ Blood-vessels			1
	{ Osseine			32
	{ Fatty Matters			9
	{ Water			8
Mineral Substances.	{ Phosphate of lime			38
	{ Phosphate of magnesia			2
	{ Carbonate of lime			8
	{ Various salts			2
				100

The above-named matter, *osseine*,—

C	50.4
H	6.5
N	16.9
O	26.2

and which has been erroneously called gelatine, is insoluble in water, weak acids, and alkalies, whilst gelatine presents properties directly reverse. But what has led to this popular error is that *osseine*, when boiled in water, becomes converted into the isomeric substance commonly called gelatine. As I shall have to dwell on this substance at some length in my next two lectures, I will not detain you now further than to state that *osseine* is obtained from bones by placing them in weak hydrochloric acid, which dissolves the phosphate of lime and other mineral salts, washing the animal matter (*osseine*) until all acid is removed,

drying it, and treating it with ether to remove fatty matters. I cannot leave this subject without remarking on the extraordinary stability of this animal substance, for it has been found in the bones of man and animal after many centuries, and even in small quantities in fossil bones.

The fatty matter of bones is made useful in the manufacture of soap, railway grease, and in other purposes; it is obtained by taking fresh bones (as bones which have been kept a long time will not yield their grease easily) and placing the spongy parts, or ends of the bones (where most of the fatty matter exists) in large boilers filled with water, which is then carried to the boil, when a part of the osscine is converted into gelatine, and the fatty matter liberated, which rises to the surface, and is easily removed. The bones thus treated are called boiled bones, and receive many important applications, to which your attention will be called in a few minutes. Benzine and bisulphuret of carbon have been used as substitutes for water in the above operation, but the advantages do not seem to have been sufficient to lead to their general adoption.

Mineral Matter of Bones.—These, as the foregoing tables show, are chiefly represented by phosphate and carbonate of lime. The immortal Berzelius was the first to establish the fact that phosphate of lime was the only substance possessing the properties necessary for the formation of bone, owing to the extremely simple chemical reactions which cause the soluble phosphates to become insoluble. Let us trace shortly the sources from whence we derive the large proportion of phosphate of lime which exists in our frames. Several of our most eminent chemists have proved the existence of phosphorus in sedimentary and igneous rocks, and the important part played by phosphorus in nature cannot be better conveyed to your minds than by this extract from Dr. Hofmann's learned and valued Report on the Chemical Product in the Exhibition of 1862:—“ Large masses of phosphorus are, in the course of geological revolutions, extending over vast periods of time, restored from the organic reigns of nature to the mineral kingdom by the slow process of fossilisation; whereby vegetal tissues are gradually transformed into peat, lignite, and coal; and animal tissues are petrified into coprolites, which in course of time yield crystalline apatite. After

lying locked up and motionless in these forms for indefinite periods, phosphorus, by further geological movements becomes again exposed to the action of its natural solvents, water and carbonic acid, and is thus restored to active service in the organisms of plants and lower animals, through which it passes, to complete the mighty cycle of its movements into the blood and tissues of the human frame. While circulating thus, age after age, through the three kingdoms of nature, phosphorus is never for a moment free. It is throughout retained in combination with oxygen, and with the earthy or alkaline metals for which its attraction is intense." After these eminently philosophical views by Dr. Hofmann, I will proceed to call your attention to the application of bones to agriculture. Bones are generally used for manuring in one of these three forms,—1st. As ground green bones; 2d. As ground boiled bones—that is, bones nearly deprived of their osseine by boiling under pressure, as I shall describe in my next lecture); 3d. Superphosphate of Lime.

Green or raw bones have been used on grass land for a long period, but their action is exceedingly slow and progressive, owing to the resistance of the organic matter to decomposition and the consequently slow solubility of the phosphate of lime in carbonic acid dissolved in water. What substantiates this view is that boiled bones are far more active than the above. It is found that 30 to 35 cwts. per acre of these will increase the crops on pasture land from 10 to 20 per cent. in the second year of their application. But the great advantage which agriculture has derived from the application of bones as a manure has arisen from their transformation into superphosphate of lime, especially application to root and cereal crops. To Baron Liebig is due the honor of having first called the attention of farmers (in 1840) to the importance of transforming the insoluble phosphate of lime of bones into the soluble superphosphate, rendering it susceptible of immediate absorption by the roots of plants, and of becoming at once available for their growth. These suggestions of Liebig were rapidly carried out on a practical scale by Messrs. Muspratt, of Lancashire, and J. B. Lawes, of Middlesex; and in consequence of the valuable results obtained by them, the manufacture of artificial manures has gradually grown into an important branch of manufacture in this country. The manufacturer

of superphosphate of lime is so simple that any farmer possessing a knowledge of the mere rudiments of chemistry can make it for himself, by which he will not only effect great economy, but also secure genuineness of product. All he requires is a wooden vessel lined with lead, into which he can place 1000 lbs. of ground boiled bones, 1000 lbs. of water, and 500 lbs. of sulphuric acid sp. gr. 1.845 (or concentrated vitriol), mixing the whole, and stirring well for about twelve hours. After two or three days a dry mass remains; which only requires to be taken out and placed on the land by means of the drill, or to be mixed with water and sprinkled on the land. When very large quantities of this manure are required, the plan devised by Mr. Lawes appears to be the best suited. It consists in introducing into the upper end of a slightly-inclined revolving cylinder a quantity of finely-ground boiled bones, together with a known proportion of sulphuric acid of sp. gr. 1.68. As the materials slowly descend by the revolution of the cylinder they become thoroughly mixed, and leave it in the form of a thick pasty mass, which is conducted into a large cistern capable of containing 100 tons, or a day's work. This is allowable to remain for twelve hours, when it is removed, and is ready for use. Most manufacturers find it necessary to add to the phosphate of lime of bones other sources of phosphates, such as coprolites, or the fossil dung of antediluvian animals, which have been found in large quantities in Suffolk, Cambridgeshire, and elsewhere, and contain from 36 to 62 per cent. of phosphate of lime, and from 7 to 38 per cent. of organic matter. Others employ a mineral substance called apatite, containing about 92 per cent. of phosphate of lime, and found also in large quantities in Spain Norway, France, &c. Others, again, employ guanos rich in phosphate of lime, such as those of Kooria Mooria Islands and Sombrero phosphates. The following is the average composition of the superphosphate of lime of commerce:—

Soluble phosphate	.	.	.	22 to 25 per cent.
Insoluble "	.	.	.	8 " 10 "
Water	.	.	.	10 " 12 "
Sulphate of lime	.	.	.	35 " 45 "
Organic matter	.	.	.	12 " 15 "
Nitrogen, 0.75 to 1.5 per cent.				

The valuable and extensive researches of Messrs. Lawes and Gilbert and Messrs. Boussingalt and Ville have not only demonstrated the importance of phosphates to the growth of cereal and root crops, but also that phosphates determine, in a great measure, during vegetation, the absorption of nitrogen from the nitrates or from ammonia, as will be seen by the following table:—

Amount of Nitrogen fixed by Wheat under the influence of following Salts:—

	Without nitrogenated compounds.	With nitrogenated compounds.
Phosphate of lime and alkaline silicate	8.15	20.08
Phosphate of lime	7.25	19.17
Earths and the alkaline silicates	5.71	11.16
Earth	3.00	9.50

Bone-black or Char.—In 1800 Löwitz made the interesting observation that wood charcoal possessed the remarkable property of removing coloring matters from their solutions. In 1811 Figuier also observed that animal black had far greater decolorating power than wood charcoal, and bone-black has consequently become one of the principal agents in sugar-refining, and has been the means, more than any other substance, of producing good and cheap white sugars. To give you an idea of the extent to which bone-black is used at the present day for decolorating purposes in the refining of sugar, I may state that in Paris alone it is estimated that about 11,000,000 kilogrammes of bones are used annually for that purpose. The preparation of bone-black is simple in principle. It consists in placing in cast-iron pots about 50 lbs. of broken boiled bones, that is, bones which have been deprived of their fat—of most of their osséine—and piling these pots in a furnace, where they are submitted to a gradually rising temperature during twenty-four hours, such as will completely decompose the organic matter, but not so high as to partly fuse the bones and thus render them unfit for their applications. But a more economical process is generally adopted. It consists in introducing the crushed bones into horizontal retorts, which are themselves in connexion with con-

densers, the ends of which are brought under the retorts to assist by their combustion in the distillation of the animal matter. By this arrangement not only is char obtained, but oily matters which are used by curriers, and also ammoniacal salts employed in agriculture and manufactures. The extraordinary decolorating action of animal blacks may be considered as partly chemical and partly mechanical—mechanical because it is proved, by some interesting researches of Dr. Stenhouse, to which I shall refer further on, that the action is due to the minute division of the carbon and the immense surface offered by its particles to the coloring matter, char being composed of 90 parts of mineral salts to 10 per cent. of carbon. On the other hand, the action is proved also to be chemical, by the fact that water will not remove the coloring matter, whilst a weak solution of alkali will dissolve it. Dr. Stenhouse's valuable researches not only illustrate fully this fact, but also prove the possibility of producing artificially substitutes for bone-black. In 1857 he published a paper describing the production of an artificial black, called by him aluminised charcoal. This he obtained by mixing intimately and heating finely pulverised charcoal and sulphate of alumina, when he obtained a powerful decolorating agent, containing seven per cent. of alumina, and well adapted for decolorating acid solutions, such as those of tartaric and citric acids, in chemical works. He also prepared what he called coal-tar charcoal, by melting one pound of pitch in a cast-iron pot, adding to it two pounds of coal-tar, and mixing intimately into it seven pounds of hydrate of lime, then carrying the whole to a high temperature, allowing it to cool, and removing the lime by washing the mass with hydrochloric acid and then with water, when carbon in a high state of division was obtained, possessing powerful decolorating properties. The following series of experiments by Dr. Stenhouse perfectly illustrate the chemico-physical action of animal black as a decolorating agent. He boiled a certain amount of char and his two charcoals with a solution of logwood, then treated each black separately with ammonia, when the following results were obtained:—Aluminised charcoal yielded no color; bone black but a slight amount; coal-tar charcoal large quantities. But it would be

wrong in me to leave you under the impression that animal black can only remove colors from solutions. Purified animal black—that is to say, animal black deprived of its mineral matters by the action of muriatic acid and subsequent washing—has the power of removing certain bitters from their solutions. Thus Dr. Hofmann and Professor Redwood applied this property with great skill some years ago to the detection of strychnia in beer. Again, Thomas Graham, Esq., Master of the Mint, published a most interesting series of researches, in which he established the fact that purified animal black had the power to remove a great number of saline matters from their solutions, such as the salts of lime, lead, copper, &c.

Revivification of Bone Black.—After a certain quantity of syrup sugar has percolated through the cylinders containing bone-black, the interstices become so clogged with impurities that it loses its power of decolorating the syrup. Sugar refiners are therefore in the habit of restoring the power of their bone-black, generally speaking, by submitting it to a process of calcination, which volatilises or destroys the organic matter fixed by the char. It has been proved by experience that char may undergo this operation about twenty times before its pores become so clogged with dirt as to render it useless. [Here the lecturer described, with the aid of drawings, several of the various apparatus used in sugar refineries for the above process, alluding particularly to that of Messrs. Pontifex and Wood, by which a ton of char is revivified every twenty-four hours.] A new process, however, has been devised by Messrs. Leplay et Cuisinier, which as a whole deserves the attention of refiners, though I am aware that several of the details of their process have been used for some time. The char which has served its purpose in the cylinders, instead of being removed, is treated at once by the following processes:—It is first thoroughly washed, treated by steam to remove all viscous substances, then a weak solution of alkali is allowed to percolate through the char, which removes saline matters and a certain amount of coloring matter, when it is further acted upon by weak hydrochloric acid, which, in removing a certain amount of the lime salts, liberates the coloring matter; the char is again washed with weak alkali to

remove the remaining coloring matter, and lastly the decolorating power of the black is restored by passing through it a solution of bi-phosphate of lime. It is to be hoped that the high praise bestowed upon this process on the Continent may induce our manufacturers to try it, as they would obtain two distinct advantages by its use. First, the economy of operating at once upon the black and restoring its properties without removing it from the cylinders. Secondly, the prevention of the noxious odors given off during the revivification of char by the ordinary methods. It is interesting to note one of the results of the different employment of char in this country and on the Continent. In England the wear and tear in sugar refinery is constantly repaired by the introduction of fresh char, and there is no spent or old char for sale. In France, on the contrary, owing to the great impurities in their beet-root sugar syrups, and to the use of blood in refinery, the char becomes rapidly clogged with organic matter, and is so completely animalised, that its value as a manure exceeds what the char originally cost the refiner. The result is that French "spent" char is annually exported to the French colonies to the amount of 120,000 tons, and is there used as a manure to promote the growth of the sugar cane. So important is this article of commerce considered, that the French Government have appointed special analytical chemists to determine its value for the trade.—*Lon. Chem. News.* July 9, 1865.

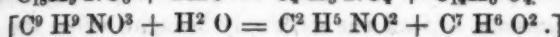
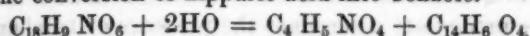
MEDICAL ANALYSIS; DETERMINATION OF THE PURITY OF COMMERCIAL MEDICINES.

By C. R. C. TICHBORNE, F. C. S. L.

Acidum Benzoicum $HO.C_6H_5O_3 = 122$. [C⁷ H⁵ OHO.]

Benzoic acid occurs in light feathery crystals, made by sublimation, which appear to be six-sided prisms. It dissolves in 200 parts of cold and 30 parts of boiling water. It is very soluble in ether and alcohol. Benzoic acid is seldom adulterated; when heated it sublimes without any residue. This is the best test that can be applied. It was once stated that naphthaline was used to adulterate this substance—the author never met with a case—but a specimen was once seen which was crystallized from

a solution, the original source of which was evident from the odor—cow's urine. It came from Germany, and was, no doubt, got by the conversion of hippuric acid into benzoic.

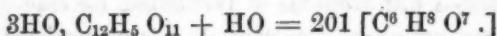


Hippuric Acid. Water. Glycocine. Benzoic Acid.

The decomposition may be effected by sulphuric acid, hydrochloric acid, nitric acid, oxalic acid, or by the action of a ferment.

This acid should be colorless, and should, as already stated, be entirely volatilized by heat. There should be little or no aroma, and, if any, it should possess an aromatic smell resembling vanilla. The benzoic acid, before it passes from the manufacturer's hands, is put up in one ounce bottles, which are sometimes made short weight—a common practice with both this article and sulphate of quinine.

Acidum Citricum.



Citric acid is met with in two forms—viz., in colorless right rhombic prisms, having the composition $2 \text{C}_{12}\text{H}_8\text{O}_{14} + \text{HO}$; this variety constitutes the commercial article, and also another form having the composition $2 (\text{C}_{12}\text{H}_8\text{O}_{14}) + \text{HO}$, the water in this case probably being mechanically combined. It is soluble in 0.75 parts of cold and in 0.5 parts of boiling water; readily soluble in alcohol, but insoluble in ether.

Tartaric acid is the only adulteration practised with citric acid. *This fraud is best determined by adding a solution of acetate of potash to a solution of the citric acid under examination, each solution being pretty concentrated. A precipitate of bitartrate of potash is produced if tartaric acid is present.*

Sulphuric acid, oxalic acid, and lead, are the usual impurities occurring.

After having been examined for tartaric acid, it may be tested for these impurities in the following manner:

1. Lime water is added in excess to a dilute cold solution of the citric acid.

A white precipitate is indicative of the presence of oxalic acid.

2. The fluid in which lime water has failed to produce a precipitate, or the filtrate from the above precipitate is acidulated with hydrochloric acid, and chloride of barium added.

A white precipitate determines the presence of sulphuric acid.

The presence of lead was strikingly brought before the author by a Dublin friend having taken out of a sample of citric acid a considerable per centage of metallic lead, independently of that held in solution.*

The presence of a trace of sulphuric acid, which is almost always present, may be overlooked in a great measure,—but the occurrence of lead and the large quantities found in commercial samples is a matter of much greater importance.

The pieces of metal found in citric acid are very small, and are imbedded in the substance of the crystals.

Citric acid should leave no perceptible ash when burned. After ignition the crucible should be washed out with diluted nitric acid and evaporated to dryness; the residue is again dissolved in water and tested with sulphide of ammonium for lead.

Sixty-seven grains of the crystals are neutralized by 100 measures of the volumetric solution of soda of the Pharmacopœia.†

* Citrate of lead is soluble in *free* citric acid, and is not precipitated from this solution by ammonia.

† Volumetric solution of soda, B.P.

Soda $NaO = 31$. Take of solution of soda a sufficiency, distilled water a sufficiency. Fill the volumetric tube to O with the solution of soda, and drop this into sixty-three grains of oxalic acid, dissolved in two fluid ounces of the water until the acid is exactly neutralized, as indicated by litmus. Note the number of measures (N) of the solution used, and having then taken forty ounces of the solution of soda, augment this quantity by the addition of distilled water until it becomes

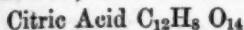
$$\frac{4000}{N} = \text{fluid ounces.}$$

If, for example $N = 93$, the forty ounces of solution of soda should be diluted so as to become

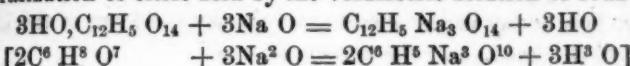
$$\frac{4000}{93} = 43.01 \text{ fluid ounces.}$$

The quantity of this solution which fills the volumetric tube to O includes 31 grains of soda, and will, therefore, neutralize an equivalent in grains of any monobasic acid. It is generally necessary to recrystallize the oxalic acid for titrating this volumetric solution. Mr. Maumené finds the first

It will be observed that only one-third of an equivalent in grains is neutralized by the 100 measures of volumetrical solution of soda, although that number of measures contain a full equivalent in grains of soda, which would neutralize or = one equivalent of any monobasic acid, but citric acid is what is termed a tribasic acid, and the neutral salt is a trimetallic salt. Thus—

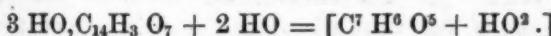


Therefore we have the following decomposition occurring in the neutralization of citric acid by the volumetric solution of soda:—



Citric acid is frequently slightly tinged; this is due to the charring of the organic matter by the sulphuric acid employed in its manufacture, and from other causes.

Acidum Gallicum.



This is a tribasic acid. When pure it occurs in white acicular prisms, but is generally found in commerce more or less colored, (described in the Pharmacopœia as a pale fawn color). It dissolves in 100 parts of cold and 3 parts of boiling water. It is very soluble in alcohol, but less soluble in ether.

If we except the coloring matter, this acid is generally pure. The Pharmacopœia tests will meet every case—viz.,

"It leaves no residue when burned with free access of air. Its solution gives no precipitate with gelatine."—*Medical Press, Dublin, May 31, 1865.*

crop of crystals the most impure when recrystallizing; he recommends dissolving the ordinary acid in sufficient water to give from 10 or 15 per cent. of the original weight employed, when crystallization has taken place these are to be rejected; mother liquors yield a purer crystal. This treatment may be repeated until oxalic acid is procured practically pure. The writer would recommend acidulating the liquor with nitric acid before the last recrystallization.

NOTES ON THE CANTHARIDES OF THE ARGENTINE PROVINCES.*

BY DR. HERMANN BURMEISTER.

The remarks of Don Camilo Giovanelli on the cantharides of this country, in the "Revista Farmacéutica," vol. iv. no. 3, p. 71, induce me to send you a more detailed notice of these insects, so useful in medicine, and so abundant on our soil, as also in all other warm countries.

Cantharides belong to a family of *Coleoptera Heteromera*, *i. e.*, of that section of *Coleoptera** which have five joints in the four fore feet, and only four in the hind feet; and this family is easily distinguished from others of the same section by its soft body, less horny on the surface; as also by the form of the hind part of the head, and the cloven claws.

The celebrated Latreille, the first entomologist of his time, has called the family of cantharides "*Vesicifera*," alluding to the caustic property possessed by many (although not by all) of the species. This property seems to reside, not in the fluids, but in the solids of the body, and chiefly in the horny covering; and it is stronger in proportion as that covering is rougher and more metallic. On this account, the European cantharis is probably one of the most efficacious, for it is one of the most resplendent, in its golden-green metallic lustre.†

The family of the *Vesicifera* is divided into two principal sections, *viz.*, *Meloïdes* and *Cantharides*. The former have no wings, and the elytra are usually short; but the latter have longer elytra, and are furnished with wings.

Amongst the *Meloïdes* there is one species, *Meloë Proscara-bæus*, which was at one time considered an antidote to hydrophobia. We have in this country only a single species of this section, *viz.*, *Meloë miniaceo-maculatus*, figured in D'Orbigny's "Voyage to South America," (Insect. tab. 15, fig. 6). I have found this insect (which is easily recognized by the red spots on its small elytra) a few times in the interior of the province of Buenos Ayres. Another species, the *Meloë Klugii*, described

* "Revista Farmacéutica" of Buenos Ayres, January, 1865.

† It may be observed, however, that *Mylabris Cichorii*, Fabr., which is devoid of metallic brilliancy, has vesicating powers quite equal to those of the common cantharis.—ED. PH. J.

and figured by Brandt and Erichson, in the Transactions of the Acad. Cœsar. Leop. Car., vol. xvi. pl. i. p. 103, t. 8, is found in the Banda Oriental. I have myself collected, during my travels in the Argentine Provinces, two new species,—the one in Mendoza (*M. sanguinolentus*, nob.), the other in Catamarca, (*M. ebeninuz*, nob.) These four species are hitherto only known to exist in this part of South America.

The *Cantharides* are far more numerous, not only in other countries, but also in the Argentine Republic. Entomologists divide them into various genera, of which I have met with the following in this country:—

1. *Horia maculata*, Fabr.—This lives with the great bees which make their nests in the trunks of vines, and are called *Mangangas* (*Xylocopa*). The beetle destroys the bee by eating up its food, and even the bee itself in the grub state. It is the largest of all our native cantharides, being above an inch long. It is of a yellow color, with black spots on the elytra.

2. *Tetraonyx*, Latr.—This has the body more robust—shorter and proportionally broader—than the other genera of the same family; it has also the antennæ less elongated and rather thicker; and the tarsi short, with broad triangular articulations. I have collected three Argentine species of this genus, one in Tucuman, two in Mendoza.

3. *Cantharis*, Latr. (*Lytta*, *Fabr.*)—Body longer or shorter, narrow; antennæ long, slender; feet elongated, with narrow slender articulations: these characters distinguish the true cantharides from allied genera. It is the most numerous group of all, containing above 100 species. I have collected in the Argentine Provinces up to this date eight species, of which only three were previously known. I shall confine myself to naming these three, which are:—

Cantharis adspersa (*Lytta adspersa*, *Klug*, *Nova Acad. C. L. C. Ac.* vol. xii. pl. 2, p. 434, t. 25).—It is this species which is known here as the *Bicho moro*, and is so abundant in our gardens, where it does great damage by eating seedling plants. I have found it also in the Banda Oriental, and in the province of Mendoza.

Cantharis punctata (*Lytta punctata*, *Germar*, *Spec. Insect.* Nov. i. 175, 287).—Very like the *Bicho moro*; but the elytra

are more strongly marked with black dots, and the feet are of the same brownish black as the rest of the body. I have found this in the Banda Oriental, and in Entre-Ríos near the Paraná.

Cantharis vittigera (*Pyrota vittigera*, *Bl.*, *D'Orbigny*, *Voy. Entom.* 200, t. 15, f. 7).—Collected on the Paraná.

The last of these three species is naked on the surface; the other two have a very fine brown pubescence, with naked points. The remaining species are clothed in the same way, except one very small one from the Banda Oriental, and another very large one from Catamarca and Mendoza, and probably along the whole western side of the Republic (La Rioja, San Juan) at the foot of the Cordillera. This species, which I call *Cantharis viridipennis*, is one of the largest of all, being nearly an inch long, of a black color, with yellow feet, and metallic-green elytra. It is probably also the most efficacious of the Argentine species, being the only one that has a metallic lustre, like the European species. The apothecaries of Mendoza employ it with very good effect.

4. *Nemognatha*, Illig.—This genus is easily distinguished by the prolongation of the lower mandible into a longish thread. I have one species, hitherto unknown, of a yellow color, with black antennæ and tibiae, from the Paraná. I shall call it *N. nigricornis*.—*Lond. Pharm. Jour.*, April, 1865.

A NEW METHOD FOR PREPARING BENZOIC ACID.

By MM. P. and E. DEPOULLY.

This process is founded on the transformation of phthalic into benzoic acid.

The division of phthalic acid into benzoic and carbonic acids was foreseen by Gerhardt; when he placed phthalic acid and naphthaline in the benzoic series, he considered that this acid was to benzoic acid what oxalic is to formic acid. (Gerhardt, "Chimie Organique," iii. 413).

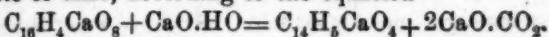
M. Berthelot (Chimie Organique Fondée sur la Synthèse, i. 348), speaking of the complete division of phthalic acid into benzine and carbonic acid, expresses himself thus in a note: "Were the decomposition arrested half way, benzoic acid would doubtless be produced."

M. Dusart has since, but without success, endeavored to effect this division; but by distilling a mixture of phtalate of soda, oxalate and lime, he has obtained, among other products, small quantities of hydride of benzoil, (*Comptes Rendus*, 1862, lv. 448).

We prepare phtalic acid by means of naphthaline, and we transform it into salt of lime.

We mix an equivalent of neutral phtalate of lime bicalcic phtalate, with an equivalent of hydrated lime, and maintain it for several hours at a temperature of from 330° to 350°, not allowing free access of the air.

The salt will then be entirely transformed into benzoate and carbonate of lime, according to the equation—



We extract the benzoate of lime by water, concentrate the liquids, and precipitate the benzoic acid.—*Chem. News*, (Lond.) May 26, 1865, from *Comptes Rendus*, ix.

ALLEGED POISONING BY OIL OF BITTER ALMONDS.

A case of poisoning near Maidstone, which we find reported in the *Chemist and Druggist*, deserves some notice as of interest to toxicologists. A lady purchased, it is said, some essential oil of bitter almonds to scent pomatum, made use of some for the purpose, and left the bottle on the kitchen table, some time, it would appear, before the servants' dinner hour. The exact hour is not stated, but we may presume it was before the middle of the day. Finding the bottle on the table, the cook took it up and tasted its contents. She stated that she merely put the bottle to her lips, but did not swallow any of the contents. It tasted bitter, and she ate a piece of bread to take the taste out of her mouth. She saw the deceased (a page boy, aged thirteen) take up the bottle and put it to his lips, and she took it away from him. The boy told her he did not swallow any of the contents. Shortly after this the servants had their dinner, and an hour afterwards the cook was taken ill, but the boy went about his work as usual. A medical man who was sent for found the cook unconscious; was told that she had swallowed some oil of bitter almonds, so he administered some brandy, and she soon rallied. At this time there was nothing the mat-

ter with the boy. The medical man, on leaving the house after attending to the cook, met the boy out with his master in the carriage. In the course of the evening the lad was taken ill, and the doctor was again sent for. He found the deceased insensible, almost pulseless, and his teeth so tightly closed that he had great difficulty in getting a piece of cork between them. Brandy was administered freely, but without success. He was carried up stairs about seven o'clock in the evening, and died at a quarter past eleven. At the inquest the medical man stated, "that he had no doubt the deceased died from the effects of having taken oil of almonds. If the boy had taken a larger quantity his stomach would have rejected it at once, and it might not then have got into his system. He should say the deceased and the cook must have taken a teaspoonful each." In the last words spoken by the boy he denied having swallowed any.

In a note to the report our contemporary says—"We have been informed that the poison was not genuine oil of almonds, but a factitious oil," and it must be quite clear to any one acquainted with the subject that the poison was not essential oil of bitter almonds. Everybody knows that the poison in this oil is prussic acid; and we believe we may state with truth that there is not a case on record in which the symptoms of poisoning by prussic acid have been delayed for the length of time which elapsed in this case. All the circumstances lead to the suspicion that the poison taken was *nitrobenzole*, the dangerous properties of which body are not sufficiently known. It may be, indeed, that this more dangerous poison was sold in innocence as oil of bitter almonds not containing prussic acid.

The case of this boy bears a considerable resemblance—so far, we ought to say, as we can gather from the report of the inquest—to the case of a lad who died from the effects of a few drops of nitrobenzole which he took by accident at a chemical manufactory. In that case four or five hours elapsed before the fatal symptoms came on, and the duration of the symptoms was about the same in each case.

In the interest of science we must hope that this case will receive further elucidation, both from the druggist who sold the poison and the medical man who attended the deceased.—*Chem. News, (Lond.), May 26, 1865.*

RESINA JALAPÆ, P. B.

BY MR. A. F. HASELDEN.

Whilst preparing some resin of jalap according to the process set down in the British Pharmacopœia, several points occurred to me as seemingly worthy of consideration and inquiry. The mode of operating in the B. P. is exhaustion of the root by rectified spirit, the addition of a small quantity of water, the recovery of nearly all the spirit by distillation, the separation of the resin from the residual liquor, subsequent washing with hot water, and drying the resin with a gentle heat until it becomes brittle, breaking with a resinous fracture; and so far the process is all that is necessary in order to obtain the resin as described in the Pharmacopœia. The process might, however, have been carried further, and the brown resin thus obtained rendered colorless by digestion with animal charcoal, and thus have represented pure resin, or the jalapin of commerce. But I am far from certain that, therapeutically, the resin would have been improved. I think it quite possible that the animal charcoal does remove some of the acid principle upon which the activity of jalap, as a cathartic, depends; and I am led to entertain this opinion from the fact that I have heard that jalapin does not act proportionately as well as good powdered jalap-root.

Now, amongst other things concerning jalap, Dr. Christison has stated that worm-eaten jalap is the best for the preparation of the resin. The late Dr. Pereira apparently entertained the same opinion, for, in his writings, he says jalap-root is apt to become worm eaten, the insects attacking the amyloseous portion, leaving the resin; hence worm-eaten jalap is to be preferred for the preparation of the resin. On the other hand, Duncan, Thornton, and Brände say that worm-eaten jalap should be rejected. I may probably be thought presuming when I state that I cannot entirely coincide with either side. Looking at the manner in which the resin is deposited in the roots, in irregular concentric rings, and sometimes seemingly pervading the whole mass, I could not conceive that these worms or insects could remove the amyloseous or extractive portion, and leave the resinous part untouched. I, therefore, proceeded to extract the resins from two portions of jalap-root, the one worm-eaten,

the other sound, as far as I could judge of the same quality in other respects—samples of them being upon the table—the worm-eaten gave me one ounce of resin from eight ounces, or 12.5 per cent., and afterwards, by boiling with water, one ounce of soft aqueous extract; the sound jalap yielded from the same quantity one ounce and a half of resin, nearly 19 per cent., and two ounces, or 25 per cent., of the aqueous product. Thus, though a wholesale manufacturer might use the worm-eaten for the preparation of resin, seeing that it would not command a ready sale as jalap-root for tincture, I should myself prefer the sound root. The next point of inquiry which suggested itself to me was one arising from the fact that the good Vera Cruz jalap being very dear, and another kind, described as Tampico jalap, being offered at a less price, the difference being one shilling and sixpence per pound, whether it would yield as good a product as the kind known as Vera Cruz jalap. It may be perhaps worth while to mention that Tampico is a port on the Gulf of Mexico, north of Vera Cruz, whence the jalap is exported, and from which circumstance it probably takes its name.

Operating upon the same quantity of this Tampico jalap, some of which is upon the table, I obtained exactly the same quantity of resin as I had done from the *sound* Vera Cruz, viz., 19 per cent., but only 10 per cent. of the aqueous extract. The next question which suggested itself was whether this and similar resins could be (following the *Pharmacopœia* directions) as well prepared with methylated as pure spirit? Judging from two samples on the table, I should say not. Although subjected to distillation, subsequent washing with hot water, and evaporation in an open vessel, these resins still most tenaciously retain the unpleasant methyllic odor, but which is almost got rid of by subsequent digestion with a small quantity of pure spirit and animal charcoal, and repeated washings with hot distilled water.

There is yet another circumstance, I think, worthy of being mentioned in reference to a test for jalap resin. In the "Pharmaceutical Journal," vol. iv., 1st series, p. 326, writing upon jalap, Dr. G. Kayser says: "The relation of jalap resin to concentrated sulphuric acid furnishes us with the means of testing these resins. We have only to moisten a little of the powdered resin in question with a few drops of concentrated

sulphuric acid upon a watch-glass, and allow it to stand for a quarter of an hour. If it be pure jalap-resin it will be gradually dissolved, assuming a beautiful crimson color, and in a few hours a brown viscid resin will separate." He continues: "I have made the same experiment with common resin, *with scammony*, etc., but none of these evinced the characteristic relation towards concentrated sulphuric acid, which is, therefore, an infallible test for jalap resin." Here I am desirous of showing that, though the sulphuric acid test distinguishes jalap resin from some other resins, it does not distinguish it from that of scammony. It will be clearly observed from the watch-glasses upon the table—the one containing jalap resin, and the other scammony resin—that the rose color is so similar that it would be impossible to tell the one from the other. The inferences to be drawn from the foregoing appear to be:—

That the P. B. process for the preparation of jalap resin is good; that worm-eaten jalap certainly possesses no advantage over sound jalap, but rather the contrary, for the preparation of resin of jalap; that good Tampico jalap is a valuable substitute for the Vera Cruz; that methylated spirit is objectionable in the preparation of this and similar resins or extracts; and that concentrated sulphuric acid is not a distinguishing test between jalap and scammony resin.—*London Pharm. Jour.*, May, 1865.

LIQUEFACTION OF PROTOXIDE OF NITROGEN.

One of the most interesting objects at a recent *soirée* at the Paris Observatory consisted in the exhibition of the liquefaction of laughing gas, the protoxide of nitrogen, by M. Bianchi. This took place at zero centigrade under a pressure of thirty atmospheres, the fluid issuing in a small jet from a strong metallic reservoir. Received in a glass tube, it retained its liquid condition by reason of the depression of temperature produced by evaporation, so that mercury being introduced solidified, and could be hammered like lead. Simultaneously, a body in the state of ignition, plunged into the atmosphere of the liquid, in which the mercury froze, burnt with a brilliant light. On pouring the protoxide into a small platinum capsule heated to redness,

the liquid was found to retain all its properties while assuming the spheroidal state, and was still able to freeze mercury contained in little glass ampullæ. Finally, the liquid protoxide became solidified under the recipient of an air-pump, the temperature being reduced to 120° below zero, Centigrade—the most intense cold yet obtained.—*Med. News*, Jan., 1865.

THE ESTIMATION OF ALUMINA BY CARMINIC ACID, AND
THE ACTION OF SOME REAGENTS ON CARMINATES.

By M. C. LUCKOW.

A solution of cochineal or carminic acid has the property of coloring carmine, a liquid containing alumina; when acidulated this liquid turns orange. The author has taken advantage of this reaction to make some analytical researches on alumina. The following are the results he has obtained. Carbonate of soda precipitates alumina imperfectly; in the presence of an ammoniacal salt the precipitation is more complete; with bicarbonate of soda instead of soda it is almost perfect. The more slowly the cold precipitation by carbonate of ammonia is effected, the more complete it is. The precipitate obtained with bicarbonate is less bulky than that obtained with neutral carbonates, and is consequently more easily washed.

The precipitation of alumina by carbonate of ammonia or ammonia is complete if the liquid is boiled until it returns to its neutral state. The filtered liquid does not give, with carminic acid, the reaction characteristic of alumina.

The cold precipitation by ammonia or by sulphide of ammonium is more complete the longer the time taken to effect it, and the smaller the excess of ammonia and the greater the excess of sulphide the better.

By passing a current of carbonic acid into a solution of alkaline alumina, the precipitation of this base is almost perfect.

By boiling an alkaline solution of alumina with chloride of ammonium until the reaction is no longer alkaline, the alumina is completely precipitated.

Alkaline carminates are soluble in water, very little so in alcohol; their solution is of a red violet color. Alkaline earthy

carminates are almost insoluble; the color of their solution is carmine red.

Carmimates are decomposed by acids, giving an orange colored solution, which does not alter on boiling. The solution of carminate of alumina, such as is obtained by the addition of tincture of cochineal to a neutral solution of alumina, free from iron, has a beautiful carmine color, which turns to violet by contact with the air, especially when hot; if the solution be acid, this change does not take place; when the free acid is tartaric or citric acid, a red pulverulent deposit, formed probably of carminate of alumina, is, after a short time, obtained; this deposit is very little soluble in water, insoluble in alcohol, but soluble in acids and in alkalies.

Carmimates of iron form precipitates of a dark violet (ferrous salts) or brown, (ferric salts), slightly soluble in water; strong acids, and also concentrated alkalies decompose them.

Carmimates of zinc, nickel, cobalt, and manganese are almost insoluble; their color is carmine violet.

Salts of lead and copper are insoluble, and dark violet in color.

By adding a solution of cochineal to a stannous salt, a violet color is obtained, becoming dark carmine if the solution is shaken in the air, or, better still, with chlorine water.

Carminate of silver is unstable.—*Chem. News, (Lond.)*, May, 5th, 1865.

DISCOVERY OF EMERY IN CHESTER, MASSACHUSETTS.

BY CHARLES T. JACKSON, M. D.,

Geologist and State Assayer.

It has been said, in England, that "a good mine of emery is worth more to a manufacturing people than many mines of gold." Such being the case, it affords me great pleasure to be able to announce the discovery of an inexhaustible bed of the best emery in the world in the middle of the State of Massachusetts, in Chester, Hampden county, quite near to the Western Railroad, which, with its ramifications, leads to the largest armories and manufactories of metallic articles in this and the adjacent States.

For more than two years, the existence of important beds of

magnetic iron ore, originally discovered by Dr. H. S. Lucas, has been known, and endeavors were made by that gentleman to organize a company for the purpose of smelting these ores. In consequence of this agitation, I was employed by John B. Taft, Esq., on the 19th of October, 1863, to examine the locality and to make report of my results to him.

On examination of my specimens of minerals, after returning to Boston, and my notes for sectional profiles of the rocky strata containing the iron ore, I found that the minerals, margarite and chloritoid, in talcose, hornblende, and mica slate rocks, indicated the occurrence of emery, the association of the rocks and minerals being identical with conditions known to exist in the localities of emery in Asia Minor.

I therefore called the attention of the owners of the property to these facts, and directed search to be made for emery, and that every mineral resembling it should be sent to me for examination. Little attention was paid to this prediction at the time, and not till I had invited Dr. Lucas, who resides in Chester, by personal representations and solicitations, to make the required search, the characters of emery being fully described to him.

On his return to Chester he soon learned that the miners were complaining of the great hardness of the supposed iron ore, and that no less than forty drills were dulled in boring a single hole for blasting. He then sent me pieces of this hard rock, in the belief that it was the emery I had predicted. On examination it was found to scratch quartz and topaz readily, and to have all the properties of emery; a chemical analysis proved it to be identical with the emery of Naxos.

The owners, resident in Boston, being notified of this discovery, went with me to the locality on the 11th of October last, when a full exploration of the premises was made. There are several large beds of rich magnetic iron ore at this locality, and the emery being magnetic (as it always is,) had caused it to be mistaken for magnetic iron ore, and many tons of it had been smelted with the carbonate of iron and hematite in the Berkshire county iron furnaces, without a suspicion, notwithstanding its refractory nature, that the ore was emery, with only a small admixture of iron ore.

The principal bed of emery is seen at the immediate base of the South Mountain, where it is four feet wide, and cuts through the mountain near its summit, at an angle of 70° inclination or dip to the eastward. Its course is N. 20° E., S. 20° W., and its known extent four miles. Near the summit of the mountain the bed expands to more than 10 feet in width, and in some places is even 17 feet wide.

The alternations of rock in two sections are as follows, beginning to the eastward:

1. *a*, Mica slate; *b*, 15 ft. soapstone or talcose rock; *c*, 2 ft. crystallized talc; *d*, talcose slate; *e*, 1 ft. granular quartz; *f*, chlorite slate; *g*, 4 ft. *Emery*; *h*, chloritoid and margarite; *i*, magnetic iron ore; *j*, hornblende rock highly crystalline.

2. *a*, Mica slate; *b*, 6 ft. magnetic iron ore; *c*, talcose slate; *d*, $6\frac{1}{2}$ ft. magnetic iron ore; *e*, chlorite slate; *f*, hornblende rock, crystallized; *g*, 7 ft. *Emery*, chloritoid and margarite; *h*, magnetic iron ore; *i*, hornblende rock.

The elevation of the upper outcrop of this bed above the immediate base of the mountain is 750 feet. There are curious rounded masses of remarkably pure emery three feet in diameter in this bed, entirely invested with a coat of delicate rose-colored margarite, and a thick layer of bright green chloritoid, the investing coat being from half an inch to two inches in thickness. It is found extremely difficult to break up these masses of solid emery, drilling holes in them for blasting being very slow and laborious, and no grip can be had on their rounded sides by the sledge. A heavy drop hammer will be required to break them to pieces—or they may be cracked by fire, if heat does not injure the emery.

A branch of Westfield river separates the South from the North mountain, a hill nearly 750 feet high, through the summit of which the great emery bed also cuts. On this hill the emery is more largely crystalline, and less mixed with magnetic iron ore. It is more like corundum, but still contains the combined protoxyd of iron, characteristic of true emery. Its specific gravity is from 3.75 to 3.80, while that from the South mountain is from 4.02 to 4.87; Naxos emery being from 3.71 to 3.72, according to my trials of it, in comparison.

On the North mountain, three large beds of rich magnetic iron

ore, distinct from the ore accompanying the emery, occur, the ore yielding 54½ per cent. of metallic iron. This ore is mined, and is smelted into bar iron by forge fires, and is also sold to mix with the hematites and carbonates of iron worked at the Lenox and Stockbridge furnaces.

Digesting the South mountain emery in fine powder with nitro-muriatic acid and sulphuric acid for a long time, it was found that 73 per cent. of it was wholly insoluble in acids; and on microscopic examination the grains were seen to be translucent, and exactly like the Naxos emery prepared in the same way; but these translucent grains are readily taken up by the magnet. I therefore infer that protoxyd of iron is a chemical constituent of true emery.

Chemical analysis of the coarsely crystalline emery of the North Mountain, Chester. Sp. gr. 3.75. H.=9.

Alumina,	46.50
Protoxyd of iron,	44.00
Titanic acid,	5.00
Silica and loss,	4.50
<hr/>	
	100.00

Emery of the South hill.* Sp. gr. 4.02. H.=9.	
Alumina,	45.50
Protoxyd of iron,	43.00
Silica and titanic acid,	11.50
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	100.00

Regarding the oxyd of iron which can be dissolved out from emery by acids as accidental, and that which cannot be so removed as an essential constituent, we shall have for the composition of three samples of emery analysed, after digestion in acids,

	Chester, 1.	Chester, 2.	Naxos best selected emery.
Alumina,	60.4	59.05	62.8
Protoxyd iron,	39.6	40.95	37.7
	<hr/>	<hr/>	<hr/>
	100.0	100.0	100.0

* The highest specific gravity of any sample from the South mountain was 4.3734.

If this view is adopted, emery must be ranked as a distinct species, and not as a mere granular form of corundum or sapphire.

In conclusion, I would state that practical trials of the Chester emery, in several of the large armories and machine shops of this and the adjoining States, have proved it to be fully equal in value to the well known emery of Naxos, which I have no doubt it will wholly supplant in this country, and that it will ere long become an article of export to Europe, either in its native form, or in a manufactured state.

It may be proper to add, that John B. Taft, Esq., of Boston, in behalf of his associates, owners of the emery mine, has the sole management of the business connected with the mine.

I would express my obligations to Mr. J. L. Smith for the valuable information contained in his articles on the emery of Asia Minor and on the associated minerals of the emery localities, published in vols. x. and xi. of this Journal. Also to Dr. H. S. Lucas, of Chester, for kind assistance in the field.

32 Somerset St., Boston, Dec. 12th, 1864.

Amer. Journ. Science and Arts; Jan., 1865.

MAGNESIUM: ITS PREPARATION AND PROPERTIES.

By EMERSON J. REYNOLDS, F.R.G.S.

Lecturer on Practical Chemistry, Ledwich's School of Medicine and Surgery, Dublin.

Little more than five years have now elapsed since two distinguished chemists and physicists, Professors Bunsen and Roscoe, while engaged in some photo-chemical researches, observed the high refrangibility of the light emitted by burning magnesium-wire, and also its great "actinic" power; these observations led them to propose it as a convenient source of light for photographic purposes. It is but recently that any attempt has been made to utilize the valuable hint thus thrown out; this has not been due to apathy or neglect, but principally in consequence of the difficulties in the way of obtaining the metal in sufficient quantities for commercial purposes. The first steps toward the simplification of the manufacture of this metal we owe to the researches of Bunsen and Matthiessen; but to St.

Clair Deville and Caron is due the productive process at present in use in this country under a patent granted to Mr. Sonstadt, of Manchester, a gentleman to whom great praise must be awarded for the energy and perseverance with which he has overcome the difficulties which lay in the way of the preparation of magnesium on a large scale. At the present time, when so many are engaged in discussing the value and best modes of applying the magnesium light to photographic purposes, it may be of interest to give a succinct account of the preparation and properties of this remarkable metal in so far as they may be of interest to our readers.

The process of manufacturing magnesium may be most conveniently described as consisting of three stages:—1. The preparation of chloride of magnesium. 2. The reduction of the metal. And 3. Purification by distillation. Each of these operations will now be considered separately.

I.—*Preparation of Chloride of Magnesium.*

The manufacture of chloride of magnesium is far from being so simple as it would seem to be. It is true that it is very easy to obtain it in solution by dissolving magnesia, or its carbonate, as commonly sold, in hydrochloric acid; but if we evaporate this solution to dryness in order to obtain the salt in the solid state, we find that as the last portions of water are being given off they decompose some of the chloride, thereby reforming magnesia and setting free hydrochloric acid, consequently the residue left by evaporation contains a considerable amount of infusible magnesia. This difficulty, however, is well known to be overcome by the addition of either common salt or the chlorides of potassium or ammonium to the solution of chloride of magnesium; no decomposition, then, occurs on rapidly evaporating the solution to dryness, in consequence of the formation of a stable and fusible double chloride of magnesium with chloride of sodium, potassium, or ammonium, as the case may be. This fact has been taken advantage of by Deville and Caron and by Sonstadt.

Mr. Sonstadt, in the specification of his patent (dated November 8th, 1862), when describing his mode of manufacturing chloride of magnesium, lays particular stress on the necessity

for excluding all traces of sulphuric acid. The reason for particularity in this respect is, that the sodium used afterwards for reducing magnesium from the chloride would likewise take away oxygen from the sulphuric acid, thereby giving rise to the production of sulphides, which are found to materially hinder the aggregation of the small globules of reduced magnesium. Mr. Sonstadt preferably used chloride of potassium for adding to the solution of the chloride of magnesium prepared as already mentioned. The compound solution is then evaporated to dryness, and the solid residue placed in a platinum crucible of sufficient size; heat is then applied until the salt has perfectly melted, and any particles of infusible matter have had time to subside. The fused salt is poured out carefully on an iron plate; it quickly solidifies, and should then be broken up and preserved in stoppered bottles until required for use in the subsequent steps of the process.

Before leaving the consideration of the first part of the process, we may quote the following words from Mr. Sonstadt's specification, as they convey a hint to our readers regarding the selection of specimens of magnesium wire:—"When the material from which magnesium is to be prepared contains ammonium, in whatever state of combination, the metal obtained from it invariably contains nitrogen, the presence of which causes the magnesium to have a yellow color, and to tarnish rapidly in the atmosphere." It might be added to this that the regularity of combustion of even thin wire seems to be decidedly interfered with by the same circumstance.

II.—*The Reduction of Magnesium from its Chloride.*

The magnesium now manufactured on the large scale is almost exclusively obtained by the action of metallic sodium on the chloride of magnesium; or, what amounts to the same, of the double salt previously referred to. There are, however, other modes of reducing the chloride, the most interesting and simple of which will be hereafter described. In order to obtain magnesium with the aid of sodium, one part of the latter, cut into small pieces, is placed in an iron crucible, and covered with five parts of the double chloride of magnesium and potassium; the cover of the crucible is now put on, and the temperature of the

whole rapidly raised to full redness. When the heat has been continued for a sufficient length of time, the crucible is allowed to cool, and when perfectly cold the cover is removed and the contents extracted. The mass is now quickly washed with water; which dissolves the saline matter, and leaves the reduced magnesium in the form of small globules more or less adherent to each other. The drying of the washed metal must be accomplished as rapidly as possible, at a temperature not higher than the boiling-point of water.

Another mode of producing magnesium has already been referred to. This consists in employing the decomposing power of the galvanic current. This mode of reducing magnesium was first successfully employed by Bunsen; but the following instructive and simple experiment is due to Matthiessen:—Take a common clay tobacco pipe with a bowl nearly globular in shape. In the cavity of the latter fuse some of the double chloride of magnesium and potassium over a gas flame. When the salt is fused pass up the pipe stem a fine iron wire; and allow it to project into the bowl, so as to have its point well below the surface of the fused salt. This wire should be connected with the negative pole of a battery of about six elements, the positive wire of which is terminated by a piece of gas coke which is made to just touch the surface of the fused mass. Decomposition at once commences, the result of which is the deposition of minute globules of metallic magnesium. This is a most interesting experiment, and one very easy performed without the least danger.

It must be recollected that the chloride of potassium present in the double salt plays but a mechanical part, and has not anything directly to do in the reduction of the metal.

III.—*Purification of the Metal by Distillation.*

The purification of the metal by distillation is the most certain and effectual method which can be adopted, and the invention of the apparatus by means of which this object can be accomplished on the large scale in an atmosphere of hydrogen is due to the ingenuity of Mr. Sonstadt. We may mention that the manufacture of magnesium on the large scale, according to Mr. Sonstadt's patents, is now being extensively carried on by

Messrs. Mellor and Co., of Manchester. The last operation which magnesium has to undergo before it reaches the hands of the photographer consists in being formed into wire. Owing to the low degree of ductility possessed by magnesium this is a matter of considerable practical difficulty, as it cannot be easily drawn in the ordinary way into wire, but requires to be forced through small apertures into a steel block, the metal being kept at a heat below redness, at which point it is much more malleable than at ordinary temperatures. On this point, however, we can offer but little precise information, as the best mode of magnesium wire-making is kept secret. Magnesium, when pure, is a silver-white metal, of specific gravity of 1.75. It presents a crystalline structure, and is rather brittle. Its equivalent is 12. It exhibits much chemical analogy to zinc, but for certain reasons it is generally classed with the metals of the alkaline earths. It melts and volatilizes at nearly the same temperature as zinc. It does not easily oxidize in dry air, but if moisture be present it is rapidly covered with a film of hydrated oxide. It is quickly dissolved by diluted sulphuric acid with formation of Epsom salt. When thrown on a little very concentrated hydrochloric acid, it bursts into flame for an instant. It is not acted on by a mixture of concentrated nitric and sulphuric acids. It burns with great brilliancy when heated in the vapor of iodine and sulphur, but less brightly in that of bromine. It also burns in chlorine.

Professor Roscoe has estimated the expenditure of magnesium at ten grains for each portrait taken with the camera; but, even with the chemicals in good working order, this may be considered the minimum weight of metal required to be burnt. In conclusion, we may observe that the steady combustion of thick wires of magnesium may be materially facilitated by having the wire flattened out by passing between heavy rollers. This "ribbon" can be now purchased, and it burns more steadily and can be ignited more easily than the round wires at present in use.—*London Pharm. Jour., from British Journal of Photography and Medical Press.*

VALUATION OF ESSENCE OF MUSTARD.

Perfectly pure essence of mustard dissolves in concentrated sulphuric acid, with hardly any coloration; but the oils often

fraudulently adulterated all become colored, either red or brown, in presence of this acid.

To test the essence introduce five drops of it, with fifty drops of concentrated and colorless sulphuric acid, into a small tube, and then shake them together. The coloration will soon become apparent if the essence be adulterated.

Rectified petroleum forms the exception, as sulphuric acid does not color it, but its presence is betrayed by its insolubility in this acid. This may be proved by operating on twenty drops of essential oil; the essence of mustard dissolves, while the petroleum floats in the form of a limpid oil.—*Lond. Chem. News, March 24, 1865.*

PREPARATION OF LIQUOR BISMUTHI.

To the Editor of the Pharmaceutical Journal:

SIR,—The process for the preparation of “Liquor Bismuthi,” which has appeared this month in your Journal, and which came under my notice some little time ago in the pages of the “Chemical News,” is similar in many important points to one which I have used successfully for more than a year; the latter resulted from a series of experiments suggested by the process of Mr. Tichbourne, which I, like Mr. Gray Bartlett, found impracticable.

Upon the appearance of the communication of the last-named gentleman, in the “Chemical News,” I tested the method there given. The results in my hands were not satisfactory, the quantity of precipitate formed being scanty in proportion to the weight of bismuth used, and a considerable portion proving quite insoluble in ammonia. I must acknowledge, however, my great obligations to that paper, from which I have largely drawn, since its appearance, for my own process; the proportions there given being almost universally adopted, as well as certain points of manipulation, which will be duly mentioned in the account to be given below. I have thus been enabled to attain for it a certainty and accuracy in which it was previously somewhat wanting, and which will, I hope, recommend it to such operative chemists as will give it a fair trial.

I had intended to reserve the following account for a paper, which I hoped to read before the Pharmaceutical Conference at

its next meeting; since, however, the subject has been brought prominently forward in your Journal, it will be more satisfactory that it should make its appearance there.

Take of Subcarbonate of Bismuth, 2 oz.

Citric Acid, 1 $\frac{1}{2}$ oz.

Nitric Acid, 3 oz.

Water;

Solution of Potash;

Spirit of Wine,—of each what is sufficient.

Dissolve the bismuth in the nitric acid, add sufficient water to take up the nitrate precipitated (from two to three ounces); carefully avoiding excess. Dissolve the citric acid in the solution thus formed, (which will not be perfectly clear,) and add gradually solution of potash (Liquor Potassæ) until the mixture is only faintly acid, and gives, after filtration, but a slight cloud on the addition of more potash. Filter, collect the precipitate, wash slightly, (the presence of a trace of nitrate of ammonia in the product is of no consequence,) and transfer the precipitate to a dish; add solution of ammonia gradually, until the precipitate is dissolved (a little oxide will remain); filter. Measure 4 fluid drachms of the solution, add excess of sulphide of ammonium, collect the precipitate on a counterpoised filter, wash, dry, and weigh; 261 grains of the precipitate thus obtained represent 237 of oxide of bismuth. Dilute the whole of the solution with water and spirit of wine, in such proportions that a mixture of one part of spirit with seven of water shall contain the required number of grains (I generally prefer four,) to the drachm of solution. In the above process, it is especially necessary to avoid the addition of an excess of potash, which appears to decompose the citrate formed and precipitate an oxide insoluble in ammonia, and this appears indeed to take place to some extent previously to saturation; a slight waste is therefore incurred, by leaving the solution faintly acid, in order to avoid the formation of this insoluble precipitate.

The chief points in which I am indebted to Mr. Bartlett, in addition to those mentioned previously, are the following:—

1. The substitution of carbonate for nitrate of bismuth. The former is far more soluble than the latter, which was used by me in consequence of its supposed greater constancy of composition

2. The solution of the precipitate in pure ammonia. Before the appearance of Mr. Bartlett's communication, a mixture of citrate of ammonia with free ammonia was used, and heat was applied.

3. The highly important addition of a quantitative analysis. A margin was formerly left to allow for loss (which is not considerable) in the manufacture, and, as above stated, the nitrate of bismuth was used as a more uniform salt than the carbonate.

The weak points in Mr. Bartlett's process appear to be the following:—

1. The great acidity of the solution from which the citrate of bismuth is ultimately separated, causes the precipitation to be extremely imperfect; there is consequently great waste of material and labor.

2. The extreme dilution of each portion of the acid bismuth solution, in the act of addition to the solution of citrate of potash, seems to determine the precipitation of basic nitrate, insoluble in ammonia, before the double decomposition necessary to the formation of the citrate can take place.

I am, Sir, your obedient servant,

THOMAS P. BLUNT, F. C. S.

—*London Pharm. Jour.*, May, 1865.

THE PREPARATION OF HYPOCHLORITE OF SODA.

By substituting a solution of bicarbonate of soda for one of carbonate in the preparation of hypochlorite of soda, a precipitate of carbonate of lime is obtained in the form of a crystalline powder, depositing itself very easily, whilst, when a solution of ordinary carbonate of soda is employed, a kind of magma forms, which it is difficult to separate from the liquid by decantation. A small excess of bicarbonate of soda in the liquid is, as has been proved by experiment, very advantageous in some respects. With hypochlorite of soda thus prepared, hardly a minute is required to bleach any kind of engraving or printing without in the least degree damaging the paper, especially if it be immediately afterwards plunged for a few seconds in water in which a little acid sulphate of soda has been dissolved.—*Chem. News*, (Lond.), March 17, 1865, from *Journal de Pharmacie et de Chimie*.

ON CHLOROFORM AND THE TESTS FOR ITS PURITY IN P. B.

By D. R. BROWN.

Chloroform seems to have been first prepared by Graham,* an American chemist, in 1831; but he was not aware of it. In 1820, Dr. Thomas Thomson gave the name of chloric ether to the compound known as Dutch liquid, the empirical formula of which is $C_4H_4Cl_2$. Somebody made a statement in Silliman's American Journal that a solution in alcohol of the so-called chloric ether was a grateful stimulant. It led Mr. Graham to attempt making it cheaply by the action of bleaching powder upon alcohol; and believing he had succeeded, he published his results, and gave a formula for its preparation in solution in alcohol. He was, however, under a mistake; what he did get was just an impure and somewhat weaker chloric ether of the present day,—that is to say, a solution of chloroform in alcohol, a solution of the compound $C_2H_3Cl_3$, and not, as he supposed, of $C_4H_4Cl_2$.

Soubeiran, in 1831, distilled bleaching powder and alcohol together; examining the product, he discovered chloroform, and gave as its formula C_2H_3Cl or $C_4H_4Cl_4$, and thus held it to be Thomson's chloric ether *plus* another double atom of Cl, and therefore named it bichloric ether.

In 1832 Liebig also discovered and examined chloroform. He failed, however, to find hydrogen in it. Not much to be wondered at, as $119\frac{1}{2}$ grains contain no more than one of Hydrogen. The formula given by him was C_4Cl_3 , and he named it chloride of carbon.

Dumas, in 1834, entered more carefully into its investigation, and as the result gave for its formula $C_2H_3Cl_3$, and named it by its present well-known designation, Chloroform. Liebig, however, while he accepted Dumas's formula, held it to be the perchloride of the radical formula $= C_2H + Cl_3$, and so named it the perchloride of formule. We may notice here that a compound with the same name differently spelt, said to be $C_4H_2Cl_3$, is described in vol. ix. of Gmelin's Chemistry, pp. 199, 200, as "the so-called Perchloride of Formyl."

Since Dumas's investigation, and perhaps very properly following upon Professor Simpson's discovery, almost the whole

* [This is an error; it should be Samuel Guthrie.—ED. A. J. PH.]

attention bestowed upon chloroform has been given to its æsthetic properties, and its chemistry has been very nearly set aside. At this moment it has different names, and is variously formulated; its specific gravity is given by some as 1.484, and by others up to 1.500; the changes it undergoes by what we call spontaneous change, and by reagents, are either not at all or ill-understood, and the chemistry of its production from bleaching powder and alcohol, etc., is yet to be brought out. We need not wonder, therefore, that its characteristics and the tests given for its purity should be found somewhat amiss. The tests given in the British Pharmacopœia are four—1st, the specific gravity 1.496; 2d, "not colored by agitation with $S O_3$ "; 3d, it leaves after evaporation no residue and no unpleasant odor; 4th, "evolves no gas when potassium is dropped into it." It is to the last of these that your attention is to be more particularly called, but a few words upon the others may be advantageous.

First, then, as to specific gravity. A perfectly pure chloroform will give a gravity of 1.500, and perhaps a very little above that; but for a commercial article, well and carefully manufactured, 1.496 is a perfectly fair standard. As it is sent out by manufacturers at present, we believe you will always find it to be from 1.498 to 1.500. Certainly anything below 1.496 ought to be held wrong. Here the editors of the "British Pharmacopœia" proceed upon a sound principle; eschewing that myth, "absolute chemical purity," they allow a fair margin, and no more; but, as we shall see, it should have been allowed all through.

The second test, "not colored by agitation with $S O_3$," is unfortunately worded. An impure chloroform agitated with $S O_3$ colors, and that deeply, the $S O_3$, while the chloroform itself is left colorless, or all but colorless. It may be almost certainly held that what is meant is, that when agitated with $S O_3$, it gives no color to the $S O_3$. "Colorless," however, must be taken *cum grano salis*. A well-prepared chloroform will stand the test provided the search for color be made by transmitted light; but scarce any can be found which will not show a very faint tint in the $S O_3$, if a piece of white paper be put behind the tube. Moreover, the test requires precaution in its use. A somewhat

dirty tube; one cleaned with a woolly cloth, off which some fibres are left behind; the contact of the finger if employed to close the tube while agitating the fluids; or some organic substance accidentally present,—will all give more or less color to the acid. With the precautions mentioned, the S O_3 test is a perfectly fair and most useful one. One other caution may be proper here, and that is, do not return the sample tested with S O_3 to the stock; Chloroform twice treated with S O_3 , Christison states, is likely to decompose.

The third, that it "leaves after evaporation no residue, and no unpleasant odor," is, for the Pharmaceutical Chemist and the physician, the most important of them all; but it needs a few words regarding the olfactory part of it. It is only a very impure chloroform that will *leave*, in the ordinary sense of the word, any unpleasant odor after its evaporation; and sometimes it happens that what is left, is of a rather pleasant flavor. And again, when chloroform, containing only a minute quantity of those deleterious oils formed with itself in the process of its preparation, is left to evaporate from a clean cloth or vessel, it is only at the last moment their offensive smell is felt; and if the sense of smell is not delicate and on the closest watch, it will not discover the taint, for it passes off *instantly*.

We come now to the fourth test given; it "evolves no gas when potassium is dropped into it."

About three weeks ago we got notice, from one of the most respectable houses in London, that the chloroform we had sent them did not stand the potassium test of the British Pharmacopœia. From the first we held the test to be inapplicable, and such as, with the specific gravity given in the British Pharmacopœia, ought not to be applied to it. We have the authority of Gregory and others that the specific gravity of pure chloroform is 1.500, and our own experiments assert the same thing. A specific gravity of 1.496, then, could only be the truth when the chloroform contained alcohol or water, or both; and to admit into the Pharmacopœia a chloroform containing those fluids, and then to apply a test for them, and reject the chloroform because they were present, seemed to us contradictory, and what could not have been the intention of the editors. We accordingly wrote our friends to the above purpose, and telling them

that we did not believe any commercial chloroform could or would stand the test. It was thought well, however, to examine the matter a little more closely.

A perfectly pure chloroform was very carefully prepared from alcohol by the process given in the B. P. Its specific gravity was 1.500; it gave no color to $S O_3$; left no residue or odor of anything after evaporation, but it yielded gas with potassium. Specimens of chloroform were got from various makers, and others were prepared from acetone and methylated spirit, and one and all tried by the potassium test *gave off gas*. At first the evolution of the gas was rapid, but very soon became slower, and a white crust was formed on the metal. On removing that crust the gas was again rapidly produced. Sodium acted like potassium. The collection and examination of the gas presents a number of difficulties not very easily overcome: the use of water is out of the question; mercury is liable to explosive amalgamation with the K or Na; other fluids present other incompatibilities with the necessities of the case, and we can only manage well when our pneumatic trough is filled with chloroform; and that, being rather an expensive fluid to work with, gives off its own vapor with the gas, and so complicates the result.

The gas got by the action of Na on chloroform, and before washing it with water, burns with a yellow flame, somewhat smoky, and sometimes with a tint of green at the edges; and mixed with about its own bulk of air, and a light applied, it explodes with almost no violence, leaving sharp acrid acid fumes in the jar. A little water shaken with the vapor left in the jar after explosion is distinctly acid to litmus, and gives with $AgNO_3$ abundant evidences of chlorine. On washing the gas with water some absorption takes place, and it then burns much more like Hydrogen, explodes more violently with air, and leaves less acid and chlorine in the jar. It is far too soon yet to say what the gas is or is not; so far as we have seen, however, it may be Hydrogen with the vapor of chloroform diffused through it, and due to water, or alcohol, in the chloroform. But an examination of the crust formed on the Na sets that aside, for it almost wholly consists of $NaCl$, which, under the circumstances, can only derive its chlorine from the decomposition of chloro-

form, or some other fluid containing chlorine mixed with the fluid called chloroform, as that is got by the B. P. and other processes. That last supposition is not likely to be the truth, but whether it be so or not it still leaves potassium inadmissible as a test; for whatever the fluid is, it is produced according to the given formula. Our belief, however, is that chloroform is one fluid, and that it is decomposed both by Potassium and Sodium.

How the error has arisen we cannot say, but the authors of the 'British Pharmacopœia' are not singular in their belief as to the non-evolution of gas from chloroform by the action of Potassium; for Liebig, as quoted in Gmelin, says that chloroform distilled over Potassium is not decomposed; and Heintz also, as quoted by Watts in his 'Dictionary of Chemistry,' states that chloroform is not decomposed by Sodium even when heated with it in a sealed tube to 200° Centigrade. In the experiment made before you, Sodium decomposes it at natural temperatures as you have seen, and so also does Potassium.

The only other matter worth mentioning is, that the crust formed on the Na is not wholly NaCl; it gives up something not yet examined to dry alcohol, and effervesces on the addition of HCl, and is strongly alkaline to litmus-paper. It is, when got of a grey color and in fine powder, soluble in water, giving a brown saline substance when again evaporated down. Heated to redness it is soluble in water, and leaves in the filter a small quantity of what looks like charcoal, and its solution effervesces more on the addition of acid than it did. These last facts point to the formation of an organic acid.—*London Pharm. Journal*, May, 1865.

ON THE ELECTRICAL PROPERTIES OF PYROXYLIN PAPER AND GUN-COTTON.

BY PROF. J. JOHNSON.

(In a letter to Prof. SILLIMAN, dated Middletown, Conn., January 25, 1865.)

You did me the honor, a year ago, to publish in the Journal a note of mine on the electrical properties of *pyroxylin paper* and *gun-cotton*, adding an approving note of your own. Having lately had opportunity to make some further experiments with the same substances, I herewith send you the result.

It is proper to say that both the paper and the cotton were prepared nearly a year ago, and may have undergone some change, though nothing of the kind was apparent to the eye, except that one sheet of the paper used seemed at one place a little discolored. •

The substances experimented with were *amber, sealing wax, sulphur, gum lac, pitch, rosin, caoutchouc* (native rubber), *hard rubber* (stick obtained of Messrs. J. F. Luhme & Co. of New York), *common vulcanized rubber* (as used in forming gas bags), *gutta percha*, and various crystallized mineral substances. But these last, becoming always positive, will not be further alluded to. The sulphur by friction with the gun-cotton always became positive, and also by friction with different sheets of the paper, except in a single instance, when using the paper which was slightly discolored, it appeared to be feebly negative. Rosin, pitch, gum lac and amber, both with the paper and the cotton, became always positive, as did also the native rubber, by which I mean the rubber as it is imported. Sealing-wax with the cotton becomes always positive, but with the paper occasionally negative. Vulcanized rubber (the kind used in making gas bags) would sometimes become positive and sometimes negative, and the same was true of gutta percha, two different specimens being used. The hard rubber (from Luhme & Co.) became always negative, both with the paper and the cotton. This being contrary to the results obtained by yourself with this substance, I made very many trials, but always with the same result.

In all cases after friction with other substances, whether the latter became positive or negative, the paper and cotton would be found invariably negative. Sheets of the paper, when handled, especially in cold, dry weather, often become highly excited,—always negatively, so far as has been determined; and my son informs me that sometimes, when handling considerable quantities of the recently prepared paper, he was even fearful that it might become ignited by the sparks produced!

I will just remark in closing, that in making experiments like these, great care is required in order that the result arrived at may be satisfactory. This is particularly the case when

it is necessary to rub a substance, as a roll of sulphur or a stick of sealing-wax, successively with different substances, some of which give the positive and others the negative electricity. Occasionally it will be found that the substance will be positive at some points and negative at others; and in such cases the only way is to lay the particular specimens aside until they shall have returned to their natural condition at all points. Sometimes a substance when first rubbed, after having remained undisturbed twenty-four hours or more, will take on one electricity, but, by continuing the friction a very little time, it will take on the other. Thus, a stick of sealing-wax in its natural state, when gently rubbed, *one or two strokes*, with a silk handkerchief, will often be found decidedly positive, but by a few strokes more it will become as decidedly negative; and it cannot be made positive again by friction with silk until allowed by repose first to return to its natural state.

—*Am. Jour. Sci. and Arts*, May, 1865.

ON TIN ORE AT DURANGO IN MEXICO.

BY PROF. C. F. CHANDLER.

I have recently examined a sample of 1450 grams of tin ore from Durango, and find it to be a handsome "wood tin" in pebbles and fibrous crusts, some of which are an inch in their longest diameter. The color varies from a very light brown to black.

Associated with the cassiterite, there are brilliant crystals of topaz, some of which are half an inch long. They vary from transparent to opaque, and from colorless to deep brown. I have not been able to examine them very closely, but have noticed the planes O , I , $\bar{2}$, and 2 . Owing to the development of the planes $\bar{2}$ and 2 , and their rich brown color, some of the crystals might easily be mistaken for cassiterite.

The sample examined gave—

Tin (by crucible assay). - - - - -	50.90
Topaz crystals easily separated by the process, - -	3.10
Other topaz crystals, too small to be easily separated, 1.00(?)	
Oxygen and impurities (by difference), - - -	45.00
	<hr/>
	100.00

The material used for the assay was very carefully averaged, by pulverizing about 500 grams of the ore, after the topaz crystals had been separated. A correction was subsequently made in the result of the assay corresponding to the quantity of topaz removed.

School of Mines, Columbia College, N. Y., Dec. 23.

—*Am. Jour. Sci. and Arts*, May, 1865.

ON THE CITRINE OINTMENT OF THE BRITISH PHARMACOPÆIA.

BY M. DONOVAN, M.R.I.A., ETC.

There is no known formula for preparing citrine ointment which will always present the same appearance and possess the same properties, and a very short time is adequate to induce changes to a certain amount. This ointment may be viewed as a metallic soap mixed with that compound which Fourcroy designates oxygenized pomatum. Oxide of mercury, like other metallic oxides, forms a soap with the fatty acids. Berthollet produced such a compound by decomposing corrosive sublimate by means of solution of soap; but it was not permanent; in process of time it became slate-colored. A soap may be formed of an analogous constitution by heating finely-levigated peroxide of mercury with lard; but the soap thus produced undergoes the same changes as that of Berthollet, first becoming brown, and ultimately slate-colored. Hence, the ointment of red precipitate can not be kept unchanged in the apothecary's shop. Citrine ointment is similarly acted on by time; if its color be ever so bright a yellow at first, it soon becomes dull, and by degrees tends to the same alterations as those already mentioned.

These changes are induced by the gradual decomposition of the mercurial nitrate and evolution of the oxide. If the decomposition be assisted by heat, the oxide is not only evolved but decomposed, and vapor of mercury is freely discharged.

Citrine ointment is of French origin. It was first introduced at the Hôtel Dieu where it was employed for the cure of itch—a disease which raged there ruthlessly at the time. The basis

of it was lard, with one pound of which an ounce of mercury dissolved in nitric acid was incorporated ; it was found very effectual. This is the same formula that was introduced into the Dublin Pharmacopœia of 1807 ; but it was so hard that it could not be mixed with other ointments so as to be smooth, without the greatest trouble, and melting could not be used without changing its chemical constitution. With a view of remedying this defect, the Colleges introduced oil, forgetting that nitrate of mercury solidifies olive-oil, and renders it even hard. Changes in the ratio of nitric acid, in its strength, in the temperature at which the solution of the mercury was effected, and at which the solution was presented to the fatty matter, were made, but failed in attaining and preserving the qualities required.

I believe that the following is the theory of these changes. As there are two oxides of mercury, so there are two nitrates, which by certain agencies become basic. When mercury is dissolved in nitric acid in the ratio directed by the Colleges, the solution will be found to contain both the protoxide and peroxide, one or other predominating, according to the temperature at which the solution was effected. The two salts soon separate ; the protonitrate crystallizes, the pernitrate remains in solution, retaining, however, a little of the former. If either of these nitrates, or its solution, be mixed gradually with water, its basic salt will sooner or later be precipitated : sooner, the less free acid it contains ; later, as it contains much ; but in every case the basic salt at length will be precipitated. If the protonitrate has been decomposed by a small quantity of water, the resulting basic salt will be white ; if by a large quantity, yellow ; if by a large quantity of boiling water, it will be bluish dark-grey. These degrees of color are due to the abstraction of successive quantities of acid. If pernitrate be decomposed by cold water, it affords an orange-brown salt ; but according to Thenard and others, if much boiling water be used, the whole acid is washed away and leaves pure red oxide.

Much the same series of changes may be observed when, instead of water, the mercurial nitrates are exposed to the action of the fatty acids ; but owing to the considerable excess of strong nitric acid and the high temperature present, additional phenomena are induced. When the nitric acid holding the

mercurial salts in solution is mixed with the melted fatty matter, the chemical action induced is first to form Fourcroy's pomatum; the uncombined acid is withdrawn by decomposition, and the basic mercurial salts, which are now yellow, communicate that color to the ointment. But the decomposition of the basic salts does not stop here; the abstraction of nitric acid still slowly continues, until at length the mercurial salts are resolved into the two original oxides—slate-grey and orange-red—by the ad. mixture of which colors an ointment of a brownish hue, lighter or deeper according to age and circumstances, will result. Heat will bring about these changes more rapidly; without heat a very long time will be required.

This series of changes took place in a remarkable manner when I repeated the process of the British Pharmacopœia for making citrine ointment. When the hot mercurial solution was poured into the hot lard and oil, and well stirred, an effervescence was excited which would soon have overflowed, but that the vessel was capable (as the Pharmacopœia directs) of containing six times the volume of the ointment. During this violent effervescence the color of the liquid ointment became continually darker, until, the effervescence having ceased, the ointment was found to be of a dark mahogany color. When perfectly cold, it did not solidify, but remained of the consistence of treacle, and might be poured from one vessel to another. The bottom of the basin in which it was made was found to be lined with a dark slate colored powder; which proved to be reduced mercury. In four months after, the ointment had attained the consistence of fresh butter in the hot days of summer.

Thus the process of the British Pharmacopœia is liable to failure. From all the experiments I have made, and they have been numerous, and varied according to the instructions of the three Colleges, I am led to believe that the degree of chemical action, as evidenced by the activity of the effervescence when the ingredients are mixed, is the main point to be attended to. If the ingredients be mixed cold, and the temperature maintained at a low degree, the ointment will be hard and of a pale yellow hue. If the ingredients be mixed very hot, and the temperature allowed to rise with the chemical action, the resulting ointment will be brown and too soft. Intermediate temper-

stures will produce intermediate colors and degrees of hardness, from impracticable solidity to absolute liquidity.

Besides color and consistence, there is another quality to be attended to. When the chemical action has been feeble, the ointment produced will be acrid and irritating, as well as hard and pale. A portion of this kind of ointment, which to the taste was very acrid when newly made, became in a few weeks much less so; in three months it was no longer acrid but metallic in taste. The frequent occurrence of this acridity induced surgeons to prescribe the ointment in a state of dilution with lard or other ointments, so that it is now almost never otherwise prescribed than diluted. Would it not be better to reduce the strength of the ointment in the formula of the Pharmacopœia to one-half, and thus put an end to the necessity of diluting it? The dilute citrine ointment, as directed in prescriptions, has no definite meaning as to strength, and the difficulty of preparing it is a continual source of annoyance to the apothecary.

I fear it is impracticable to obtain a citrine ointment which, at its first production, shall always present the same appearance and possess the same qualities by any process which does not carry into effect the following particulars, viz.: the temperature at which the mercurial solution and the fatty matters *respectively* are to be mixed, and, by art, *maintained*; the relative quantities of each of the ingredients, and the absolute quantity of the whole, which is not to be varied, for much depends on this. Were all this accomplished, the ointment would still be liable to subsequent changes, during which its medical effects must alter. So that it is probably hopeless to expect an unexceptionable process for obtaining a permanent ointment, containing nitrate of mercury in any of its forms. It might be supposed that the most prudent way to proceed would be to prepare only small quantities at a time; but here again we are met by the possible acridity of the new ointment. Dr. Duncan's process, from which he expected so much, does not obviate the difficulties in question.

A Dublin apothecary, nearly a century ago, acquired great fame for making a citrine ointment which remained apparently unchanged during a long time, and was soft from the beginning. It was known that the basis was butter. I have tried it, but found it acrid for a very long time.—*London Pharm. Journal*, April, 1865, from *Dublin Medical Press*.

HARVARD UNIVERSITY HERBARIUM.

This establishment is noticed in the Annual Report of the President of the University to the Board of Overseers, made in January last, as follows:—

“Dr. Asa Gray has presented to the University his invaluable Herbarium and his Botanical Library; which have been safely transferred to the fire-proof building furnished, at a cost of over twelve thousand dollars, by the generosity of Nathaniel Thayer, Esq., of Boston. A fund has also been raised by subscription, for the support and increase of the collection The gift of Dr. Gray cannot be estimated in money, but it embraces the results of many years’ labor faithfully given by that distinguished botanist, aided by the generosity of his collaborators and correspondents in various parts of the world.”

The collections were formally presented by the following letter:—

“Botanic Garden, Cambridge, November 30, 1864.

“To the Rev. Dr. HILL, President of Harvard University:

“*My Dear Sir* :—I have the pleasure to inform you that the Herbarium and Botanical Library, which a year ago I offered to present to the University, are now safely deposited in the building erected for their reception by Mr. Thayer. I have regarded them as belonging to the University from the beginning of the present year: but I wish more formally to make them over to the President and Fellows, as the foundation of the Harvard University Herbarium.

“The Herbarium is estimated to contain at least 200,000 specimens, and is constantly increasing. From the very large number of typical specimens it comprises, its safe preservation is very important.

“The Library, from the rough catalogue which has been made out, contains about 2200 botanical works—perhaps 1600 volumes, and nearly as many separate memoirs, tracts, &c.

“The current expenses of the establishment for the first half of the year now drawing to a close have been defrayed by Dr. Jacob Bigelow, who placed in my hands a special donation of two hundred dollars for this purpose.

“I had stated that the income of a capital sum of \$10,000

would be required to defray the current expenses of the Herbarium, i. e. for the purchase of certain collections and books not obtainable by exchange, for freights and charges, paper, alcohol, fuel, &c. I am informed that this sum, which Mr. George B. Emerson undertook to raise by subscription, is substantially secured. It is desirable, but probably not at this time practicable, that this endowment should be so far extended as to provide for the services of a Curator, so that I could myself devote valuable time to the prosecution of important botanical works for which I am prepared, and to which I am pledged.

"I have the honor to be, with great respect, very truly yours,
ASA GRAY."

We understand that extensive collections of botanical specimens, to be added to the herbarium, have recently accrued. Among them are—

A full suit of Mr. Charles Wright's collections, (about 2500 specimens,) made in Cuba during the past four years, and just now arranged and distributed among botanists.

A very interesting set of plants recently collected, chiefly by Professor Brewer, in the Geological Survey of California under Professor Whitney.

The numerous and important duplicate *Carices*, and other *Cyperaceæ*, of the late Dr. Boott, presented by Mrs. Boott; the proper herbarium, set of *Carices* having been bequeathed to the herbarium of the Royal Gardens at Kew.

A large collection of plants of Mauritius and Madagascar, and a continuation of the distribution of the British East India herbaria of Griffith, Helfer, &c., presented by the directors of the Royal Botanical Gardens and Herbaria at Kew.

A similar distribution (in continuation) of plants of the Dutch East Indies and Japan, from the Royal Netherlands Herbarium, Leyden, now under the charge of Professor Miquel.

A selection from the Mexican collection of the late Professor Liebmann (Oaks, Ferns, *Cyperaceæ*, &c.); from the Royal Danish Botanic Garden, Copenhagen.

An extensive set of authentically determined plants of Persia, Siberia, and Northern China, from Professor Bunge of Dorpat; and of Algerian plants, &c., from Mr. Cosson.

A set of Mandon's plants of the Andes of Bolivia; acquired by purchase.

A fine general collection of *Algæ*, from Professor Agardh of Lund, authentically named, according to his new *Species Algarum*.

But the most notable accession is the munificent gift which has just been made by John A. Lowell, Esq., of all the botanical books of his own library which the new establishment did not already possess, being chiefly very large, choice, and costly works, such as the *Flora Danica*, *Sibthorp's Flora Graeca*, *Bateman's Orchidaceæ of Guatemala*, the *Botanical Register*, *Botanical Cabinet*, *Botanical Repository*, *Richenback's Icones*, the large edition of *Duhamel*, the great works of *Jacquin*, and others of the same character,—in all 335 volumes, the pecuniary value of which must be reckoned at several thousand dollars.—*Amer. Jour. Jour. Sci. and Arts*, March, 1865.

THE EFFECTS OF THE CALABAR-BEAN AS AN ANTIDOTE TO POISONING BY ATROPIA.

In the ophthalmic department of the hospital at Prague last August, four boys, engaged in cleaning the room, drank a portion of a solution of atropia, thinking that it contained spirits. Two of the boys either spat out or vomited the fluid, and exhibited no symptoms of poisoning, but the two others who did not vomit were distinctly poisoned—one, however, much more so than the other. The symptoms were those of poisoning by belladonna, and consisting of delirium, dilatation of the pupils, feeble pulse, and in one there was coma, alternating with furious delirium. Both of the patients were taken to bed, one of them being restrained in a straight-jacket, and cold lotions were placed on their heads. Dr. Kleinwächter happened accidentally to have with him a solution of the Calabar-bean extract in glycerin, and by way of experiment, he gave to the patient who was the most affected ten drops of the solution (six grains of extract to one drachm of glycerine) which in about a quarter of an hour produced violent vomiting. The pulse became stronger and quicker, and rose to seventy-five and to eighty in the minute, the temperature of the body fell,

the delirium abated, the patient became more quiet, consciousness returned, urine was passed with some pain in the urethra, and the pupils became somewhat contracted. In the case of the other patient, who was less affected, some of the extract of the Calabar-bean was dropped into the eye, but without any good effect, for on the next day the symptoms were almost unchanged, while the patient who had taken the solution of the Calabar-bean internally, had almost completely recovered. The rapid and striking improvement in one of these cases appears manifestly to be attributable to the administration of the Calabar-bean extract, for the patient who was not treated in the same manner showed no improvement for forty-eight hours.—*Lond. Pharm. Journal, from Berliner Klinische Wochenschrift and British and Foreign Medico-Chirurgical Review.*

THE AGASSIZ EXPEDITION TO SOUTH AMERICA.

On the 29th of March, Prof. Agassiz, with a large corps of assistants, sailed in the steamer Colorado for Rio Janeiro, on an exploring tour in South America. His corps consists of O. H. St. John and C. F. Hartt to collect fossils and to aid in geological exploration, J. G. Anthony to collect mollusks, J. A. Allen to collect birds and mammals, G. Sceva to make skeletons of mammals, birds, the large reptiles and fishes, and Mr. Burkhardt to make drawings. Prof. Agassiz will devote himself, with native and such other assistance as he may obtain, to the collection of marine invertebrates, yet will have, for his main object, the study of the embryology of some of the remarkable fishes of the Amazon, and investigations with regard to the drift phenomena, or ancient glacial action, in the Andes.

The party is accompanied also by Dr. B. E. Cotting as surgeon, with the wives of Prof. Agassiz and Dr. Cotting, a son of Mr. N. Thayer of Boston, and a son of Mr. S. G. Ward of that city.

The expedition goes first to Rio Janeiro, whence the geological assistants will journey by land north to the Amazon, while the rest of the party, after completing investigations there, will take vessel for the same river. Prof. Agassiz and party will

then ascend the Amazon, to the Andes, and, finally, after explorations in the mountains, descend to Lima.

Professor Agassiz at first intended only a visit to Brazil for his health, and proposed to take along one or two assistants to aid him in making collections for the Museum of which he is Director at Cambridge. On mentioning his plan to Mr. Nathanael Thayer, this generous patron of science at once said "Agassiz, go home, find six assistants, and I will pay the bill." The Pacific Mail Steamship Co., hearing early of the projected tour of exploration, immediately tendered to Professor Agassiz and his wife free passage to Rio; and, afterward, on learning of Mr. Thayer's munificent proposition, Mr. McLane, in the name of the Director of the Company, offered to the whole party free passage in the new steamer Colorado, about sailing for Panama *via* Cape Horn. The arrangements were soon completed, and within three weeks after Mr. Thayer's promise was made, the expedition left New York in the Colorado.

The Secretary of the Navy has given Prof. Agassiz a letter addressed to all officers of the navy whom they may meet, in order to secure for them free transportation when desired. He offered also a government vessel to take them to their place of destination in South America, but they were already provided, through the liberality above mentioned. Every facility may be looked for also from the Emperor of Brazil, who has for some time past manifested great interest in the welfare of the Museum of Comparative Zoology at Cambridge.

Great results may be expected from an expedition under such a leader, so ably supported and so well equipped. The explorations will be mainly inland, and therefore the richer in novelties to science."—*Am. Jour. Sci. and Arts*, May, 1865.

LIQUOR POTASSÆ AS A SOLVENT FOR GUM RESINS.

Solutions of gum resins in liq. potassæ recommend themselves for their elegance and economy, while they are generally very effective. For instance, a dilute solution of ammoniacum in water is perfectly clear, whereas a tincture produces an opaque mixture. The alkaline solutions of aloes, catechu, and kino are very cheap and elegant colouring matters, a few drops

giving a deep tint to half a pint of water. The quantity of liq. potassæ best adapted for each gum resin will be found to be as follows:—

Aloes.	.	.	1 part to 15	liq. potassæ.
Ammoniacum	.	1	" 4	"
Assafoetida	.	1	" 10	"
Catechu	.	1	" 10	"
Guaiacum	.	1	" 7	"
Opium	.	1	" 10	"

Chem. News from Year Book of Pharmacy.

CORK AND ITS USES.

BY JOHN R. JACKSON.

Amongst the many materials or productions in use in everyday life, cork may certainly take a position in the foremost rank. We all know something of cork; from our earliest childhood we have been familiar with it. It is a substance that has retained all its ancient uses, as well as its importance and value, from its earliest history down to our own day. Unlike most other things, it has not, even in this age of application and invention, found a rival. True it is we have "corky" substances in abundance, produced in almost every country; but neither the productions of nature nor the productions of mechanical skill have produced an efficient substitute for cork, one that could take the place of this valuable bark, or even go side by side with it.

Considering the great quantity of cork that is consumed even in this country alone, as well as the great amount that is wasted, the quantity of bark annually stripped in the cork-forests is an operation of no little importance. The slight value many individuals place upon cork, on the whole, does not lead us in the least degree to estimate its real importance, which, in a commercial point of view, is of no trifling nature.

There must needs be a large quantity imported; for amongst wine merchants, bottled-beer merchants, or soda-water makers, a cork is never used a second time; but then what an immense bulk would go to make up a ton of cork, and yet it is by weight that the imports are estimated. There is an immense consump-

tion, and the demand of late years has almost exceeded the supply. The annual quantity imported into this country averages about 5000 tons.

Of the early history of cork, it is very clear that it was well known and in use amongst the Greeks and Romans. Theophrastus distinctly alludes to the fact, now so well known, that the continual barking of the trees tends to improve the quality of the cork. With the Greeks it was called "Phenos," while the Romans knew it by its present specific name of "Suber." Though cork was probably used in very remote times for similar purposes to those of the present day—that of stoppers for bottles amongst the rest—this, however, does not seem to have been its common or general use, inasmuch as we find that vessels of that period were frequently closed by earth, clay, and other similar substances. Stoppers of cork, or "corks," as we now call them, appear not to have been generally introduced till some time in the latter part of the sixteenth century; from that period, however, its use has been getting more and more universal in all parts of the world.

Before the introduction of cork, or its general adoption for bottle-stoppers, various articles were resorted to for this purpose. We are told that apothecaries secured the contents of their phials with stoppers made of wax, which must have been a somewhat tedious process. But even in our own day, a similar custom prevails in many parts of Europe; for with many of the Italians and Neapolitans, for instance, the practice of securing their wines, by pouring oil into the mouth of the bottle before tying it down with skin, is still very prevalent.

Before entering into the uses of cork, however, let us pay a short visit to the forests from whence it is obtained, and trace its progress from its natural position to that of its ultimate application.

Cork, as we all know, is the bark of a tree, though commercially miscalled "corkwood." It is produced by two species of oak, *Quercus suber*, L., and *Quercus occidentalis*, hence called the "cork-oaks." These trees grow abundantly in large forests in Spain, Italy, the South of France, and Northern Africa, the latter species being found alone on the Atlantic side. This

species is also peculiar, from the fact that it ripens its acorns in the second year.

In general appearance the cork-oaks differ little from the common oak, except, perhaps, that they do not attain to so large a size. There is also a slight difference in the form of their leaves—those of *Quercus suber*, L., being more lanceolate, and the margins not so deeply sinuate; the acorns are also somewhat longer and more tapering in form than those of the common oak.

The cork-oak does not require a rich soil; but, on the contrary, it seems to thrive best in poor and uncultivated ground. To collect the cork, incisions are made longitudinally and transversely in the bark of the living tree, the instrument used being a kind of axe, the handle of which terminates in a wedge-shaped form. After the bark is cut through, it is beaten to loosen it from the liber or inner bark, the wedge-shaped axe-handle being inserted to lift the bark from the trunk. The cork thus removed usually varies from three-quarters of an inch to three inches in thickness. The next operation is to divide it into pieces of a uniform or convenient size, and to flatten it, each piece having, of course, a similar curve, corresponding with the trunk of the tree from whence it was taken. For this purpose, the pieces are placed in pits and covered with water, and then pressed flat with heavy stones. The well known charred surface upon these cork slabs is caused by the application of heat at an open fire, after the steeping, for the purpose of contracting the pores. The pieces are afterwards bound up in bales, in which form they appear in the market. In removing the cork from its paternal trunk, care has to be taken not to injure the inner bark next the wood, else it would affect the second crop of bark, and perhaps injure the tree. This operation of stripping the bark, if dexterously and carefully performed, has, as we have already said, no detrimental effect, either upon the growth of the tree or the rapid formation of the new bark; but, on the contrary, the tree is said to grow more hardy and vigorously. The first crop of bark is usually taken when the tree is about twenty-five or thirty years old, but the crop is of less value than that of any succeeding gathering, as it is harder, very uneven, and more full of holes. The second gathering, however, which is in about

eight or ten years after the first, is still of an inferior quality. The third crop, collected in about eight years after the second, is usually the first marketable cork—that is, the first crop that is fit for cutting into bottle-corks. When the trees have attained to this age, so that three crops have been taken off, they usually yield a supply of good cork about every seven or eight years; and its quality improves, as well as the quantity enlarging, at each successive gathering. The season chosen for the cork harvest is usually the month of July or August.

It will be seen by the foregoing that the quality, and consequently the commercial value of cork is materially affected by soil, length of time allowed in growing, and also of care in collecting. There is as much difference existing in the quality of cork as in most other articles of daily use. The finest kind should be compact and firm, but at the same time not hard, of an even texture or grain, and of a slightly pinkish tint. This kind of cork is generally selected by wine merchants for bottle-corks; while the coarser kind, which is always more porous, full of small holes, and perhaps punctured by insects, serves for bungs for casks and for the various other applications to which cork is put in a cheap form. When cork is required to be thick, it is usually found coarse, as it must be allowed a longer period of growth to promote its thickness. The charring or singeing process to which this kind of bark is frequently subjected, for the purpose of filling up the pores and making it impervious to fluids, has also a detrimental effect, as it secretes an empyreumatic oil, which is given off and frequently taken up by the liquids it confines; but there is no doubt that care is taken in the selection of these corks, and methods adopted for the prevention of this chemical contamination, as much as possible. This operation of charring, to which all cork was formerly subjected for the purposes we have just mentioned, has been partially succeeded of late by that of boiling the cork and afterwards scraping the surface. This is said to improve rather than to deteriorate the cork, in being more effectual in filling up the pores.

The uses of cork are so numerous, and its applications so continually increasing, that the supply of late, as we have said before, has not been sufficient to meet the demand. It is not

our intention to enumerate all the uses to which this most useful article is put—indeed, it would be unnecessary to do so, so well known as they are to all; but there are a few modern uses or applications to which cork has been found suited in recent inventions, and which are, perhaps, among the “things not generally known;” but these uses chiefly consume waste or refuse cork, such cuttings as were formerly considered of no value.

The new elastic floor-cloth, now so well known as “Kamptulicon,” is a combination of caoutchouc and cork; and this is but one instance showing that cork, treated with other substances, can be made into a really useful article. Cork-dust has been used successfully with india-rubber in the process of vulcanizing, and to so fine a powder is it reduced for this purpose, that india-rubber so treated is capable of being moulded into the most delicate forms. Another recent application of cork is for stuffing beds, and we believe this is now done to a large extent.

A large Cork Company, lately established in London, and owning large forests in Portugal, have recently imported the virgin cork into this country, with the impression of its becoming useful for rustic garden-work. It is brought in very large pieces, and, from its rugged, uneven surface, which is frequently covered with lichens, together with its portability and its porous nature, which makes it capable of retaining moisture, will no doubt cause it to be used for such purposes.

Though the bark of the cork-tree contains a considerable amount of tannin, it is not in general favor among tanners, on account of its not imparting the required “bloom;” and for this reason it is seldom used alone, but is mixed with English oak bark. The inner bark is that which is used for tanning purposes, the outer bark being quite devoid of any of the required properties. The removal of the inner bark causes the death of the tree; and it is chiefly from Sardinia and some parts of Spain, where the trees are very abundant, that it is imported for this purpose. The quantity of tannin, as well as the color of the bark, varies much, according to the district from whence it is obtained. The Sardinian bark is thicker and of a deeper red color than any other.

To return to cork itself and its more common applications, we

find that there are two sorts or qualities known in commerce, called respectively white and black cork. The white, which is chiefly produced in the south of France, is the best, as it is smoother, of a more even and finer grain, and freer from holes and knots.

The operation of cork-cutting is one requiring great dexterity and neatness, and is carried on to a great extent both in France and England, though, as might be supposed, the French surpass the English in this art. Machinery has been tried for the purpose of cork-cutting, but all is now cut by hand. Considering the difficulty, with which we are all acquainted, of cutting a clean surface to cork, it is surprising to see the rapidity with which the workman turns out a perfect cork stopper from the little square pieces furnished to him. The knife used for this purpose has necessarily to be very sharp, as well as being very thin; the blade is broad, and when the edge has become dull, it is quickly sharpened on a very fine-grained stone. The bench or tube at which the workman sits has a ledge round it to prevent the corks falling off. On the Continent, a notch is made in the edge of the bench to place the back of the knife in, to prevent it from slipping. Thus the edge is uppermost, and the knife has to be guided slightly while the cork is pressed against the edge, and so dexterously turned and rounded to the required form. All the corks thus cut are thrown into a basket to be sorted, which is usually done by women and boys.

The great importance of cork as a commercial article has been the cause of experiments being tried for its introduction into the Southern States of North America. It is, however, some years since the American Government tried this plan of naturalization, for which purpose large quantities of the acorns were imported from the south of Europe. More recently, we learn, from Sir J. W. Hooker's last Report on the Royal Gardens, Kew, that steps are now being taken by the Colonial Government of South Australia to introduce the cork tree, and a number of young plants have been raised at Kew expressly for transmission to that colony.

We sincerely hope that these efforts to establish a tree furnishing so useful a product as cork, in a colony where it would

become a valuable addition to its commerce, as well as adding to the supply, which, at the present increasing rate of consumption, is much to be desired, may be crowned with success.—*Lon. Pharm. Journ.*, June, 1865, from *The Technologist*.

WHAT IS AN INCH OF RAIN.

The last weekly return of the Registrar-General gives the following interesting information in respect to rain-fall:—"Rain fell in London to the amount of 0·43 inch, which is equivalent to 43 tons of rain per acre. The rain-fall during last week varied from 30 tons per acre in Edinburg to 215 tons per acre in Glasgow. An English acre consists of 6,272,640 square inches; and an inch deep of rain on an acre yields 6,272,640 cubic inches of water, which at 277·274 cubic inches to the gallon makes 22,622·5 gallons; and, as a gallon of distilled water weighs 10 lbs, the rain-fall on an acre is 226,225 lbs avoirdupois; but 2240 lbs are a ton, and consequently an inch deep of rain weighs 100·993 tons, or nearly 101 tons per acre. For every 100th of an inch a ton of water falls per acre." If any agriculturist were to try the experiment of distributing artificially that which nature so bountifully supplies, he would soon feel inclined to "rest and be thankful."—*Jour. Franklin Institute*, from the *Jour. of the Society of Arts*, No. 639.

PRESENCE OF THE BENZOL SERIES IN CANADIAN PETROLEUM.

By C. SCHOLEMER, Esq.

Pelouze and Cahours state that American petroleum which they used did not contain hydrocarbons of the benzol series, whilst I found a not inconsiderable quantity of these compounds in the rectified petroleum from which I isolated the hydrides of heptyl, &c. As it was not impossible that this was an accidental or intentional admixture, I endeavored to procure some genuine crude American petroleum, but I did not succeed in obtaining crude genuine Pennsylvanian, as none of it had reached the Liverpool markets for months. I, however, got some real Canadian

rock oil as a thick black liquid of a very unpleasant odor. I distilled it, and treated the portion boiling below 150° C. with concentrated nitric acid, which acted violently. The acid liquid was then diluted with water, and heavy liquid nitro-compounds separated, possessing the odor of bitter almonds. These were treated with tin and hydrochloric acid, and the solution thus obtained was distilled with caustic potash. The aqueous distillate, in which some drops of an oily liquor were suspended, had the odor of analine, and gave, with a solution of bleaching powder, the most distinct aniline reaction. The beautiful rosaniline reaction, could also easily be obtained by heating one of the oily drops with bichloride of mercury. Canadian petroleum contains, therefore, the series of benzol hydrocarbons. In the preparation of hydride of decatyl from rectified petroleum, the portion boiling between 150° and 170° was purified by nitric and sulphuric acids, and thus liquid and nitro-solid compounds obtained. The solid portion was several times recrystallized from alcohol and the whole of the needle-shaped crystals thus obtained gave, on analysis, numbers very nearly agreeing with the formula of tri-nitro cumol, $C_9 H_9 (NO_2)_3$. — *Chem. News*, London, June 2, 1865, from *Trans. Roy. Soc.*, v. xiv., p. 168.

PHARMACOPÆIA OF INDIA.

For some months past, a proposition relative to a pharmacopœia for India has been under the consideration of the Secretary of State for India. The *Bengal Dispensatory* of 1842 and *Bengal Pharmacopœia* of 1844, both published at Calcutta under order of the Government, by Dr. W. B. O'Shaughnessy, have long been out of print, and copies of either work can only be obtained with difficulty. Meanwhile the study of medicine has made great progress among the natives of India, and graduates in medicine and surgery are constantly quitting the Presidency colleges of Calcutta, Madras, and Bombay, and establishing themselves in various towns of the empire. The European population is also upon the increase, and the attention of the intelligent classes is being directed more than ever to the development of the resources of that rich country.

Under these circumstances, the Indian Government has thought it advisable to authorize the publication of a work which shall afford to the medical men and pharmaceutists of India information of the same character as that supplied by the pharmacopœias of Europe, but with particular regard to indigenous medicinal products.

The labor of preparing this work has been entrusted to Mr. Edward John Waring, F. R. C. S., Surgeon in Her Majesty's Indian Army, author of a *Manual of Practical Therapeutics*, and of numerous papers on Indian pharmacology, assisted by a committee consisting of the following gentlemen, viz., Sir J. Ranald Martin, Sir William Brooke, Drs. Thomas Thomson, Robert Wight, J. Forbes Watson, Alexander Gibson, and Mr. Daniel Hanbury. The first meeting of the committee was held at Cannon Row, Westminster, on the 15th March, after an interview with Lord Dufferin, the Under Secretary of State, at the India Office.—*Lond. Pharm. Jour.*, April, 1865.

[We are glad to hear of this project. The light thrown on the *materia medica* of the East Indies since 1844 has doubtless developed much that may be usefully introduced into a Pharmacopœia for that country, and through it made known elsewhere.—*Ed. Am. J. Ph.*]

NOTICE.

American Pharmaceutical Association.

The Thirteenth Annual Meeting of the American Pharmaceutical Association will be held in BOSTON, Mass., on Tuesday, Sept. 5, at 3 o'clock, P. M.

The objects of the Association are fully explained in Article 1st of the Constitution, and the conditions of membership in Article 2d.

It is hoped that the reports of the various Standing Committees will be ready for presentation at the first sitting; and all members who have accepted subjects for investigation are earnestly requested to have their papers ready, and, should they be unable to attend, to forward them to the President of the Association, care of S. M. Colcord, Boston.

W. J. M. GORDON, President.

Cincinnati, June 21, 1865.

Editorial Department.

MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION FOR 1865.—The period fixed for the convention of this body by its adjournment is on the 5th of September, 1865, at Boston. We have received the annual notices from President Gordon, which will be found at page 313. The earlier occurrences of the meeting, the interesting locality, and above all, the cessation of the war, are points favorable to the view that a large attendance will be present. The number of subjects allotted at the last meeting is small, hence it is desirable that members should bring as many volunteer papers as possible. Last year some of the best communications were of this class, and added much value to the "Proceedings." More than two months remain for action, and we invite all who feel interested in the advancement of the Association to prepare offerings, and take or send them to Boston. There are many occurrences in most pharmacies that invite an investigation, and are suggestive of subjects for papers. Such should be noted, and, if time or ability to make them be not at command, members would do well to bring them to the meeting in the form of queries. None of our meetings have been more interesting than those whereat subjects of general interest have been brought forward for discussion, as the "Sale of Poisons," "The Drug Law," etc. All present can take part in developing them, and often those who do not write are well qualified for this engagement. Let us then meet at Boston prepared by general consent to consider some of the new questions which have arisen, and are appealing for a solution to every druggist and pharmaceutist in the country: such as the burdensome and unjust bearing of the internal revenue laws upon the business of the pharmaceutist and druggist; the actual influence which the alcohol tax is producing on the quality of pharmaceutical preparations, and on the integrity of apothecaries, as custodians of the pharmacopeial authority. The relation of the apothecary to the trade in liquors is a fruitful subject, and deserving of grave deliberation as to how far he is justified in selling liquors strictly for medicinal purposes, without requiring a license. Whether that part of the law of Congress could not be modified so as to admit apothecaries, who have no desire to extend their trade in these articles, so as to need a license, to furnish them on the occasional emergencies which all are liable to meet, without invading the law. Then again, the temptation to inebriation which this trade opens to young men and boys. We know one apothecary who takes out a license as "liquor dealer," which he finds is adequate to enable him to practice pharmacy, sell liquors, tobacco, or almost anything he pleases! What a commentary this is on the efforts of those who consider that pharmacy is a profession seriously bearing on the public health, and which should be encouraged and upheld by the authorities.

Yet another subject is the large number of Hospital Stewards thrown out of employment by the cessation of the war.

In visiting Boston, it is well to take a view of interesting objects on the route, and to vary this, going and coming. One course of special interest is that by the Hudson, taking West Point, Catskill, Lebanon Springs, &c., whilst the more direct routes, by Fall River, Stonington, etc., have their advantages. The apothecary deserves a vacation, and the hot weather of the first and second weeks of September afford a fitting season.

ON THE INFLUENCE OF THE REVENUE LAW UPON THE PRACTICE OF PHARMACY.—The business or occupation of the apothecary, called practical pharmacy, is the art of preparing and dispensing medicines. Every true apothecary feels it a duty to be assured of the good quality of the medicines he dispenses. This he does by purchasing the drugs himself, in a condition to be judged as to quality, and then to convert them into medicines himself, that he may *know* their quality. To this end Colleges of Pharmacy have been established, to teach the art, as well as science of our business, and to render the apothecary a *maker* as well as a *vendor* of medicines. The interest and welfare of the community is in unison with the encouragement of this idea, and Legislation should foster it, as one of the means conducive to public health. Is then the apothecary, who, in accordance with the requirements of the Pharmacopœia, and with his obligations to the medical profession, makes the medicines he dispenses, for the quality of which he is at least morally responsible,—is he a just subject of taxation as a manufacturer? This question has been brought home to some of our apothecaries by a circular from the U. S. Assessors, requiring them to render a monthly account of the sales of articles they manufacture, if the aggregate for one year exceeds \$600, excepting only those preparations which are proprietary, and carry a stamp. They are required to keep a record book, which will exhibit to the revenue officers the varied minutiae of their business so far as preparing medicines is concerned. It is also alleged that the tax on the *retail* manufacturer is laid upon his amount of sales at retail prices. This must be an error, as it is a discrimination against the apothecary as a manufacturer, he having certainly the right to manufacture for himself at the same rate that others manufacture for him,—that is to say, in reporting to the Assessor he is not bound to report higher prices than he could go into the market and buy the same quality of articles for, and by doing which he would avoid the tax altogether.

There are apothecaries who, in connection with their regular retail business, manufacture quantities more or less considerable of perfumery, mouth washes, tooth powders, syrups for the table, liquid rennet, etc., and some that make certain pharmaceutical preparations for other druggists, in quantities that render them liable as manufacturers. This class is few in number, and might properly be taxed in this connection; but to compel the regular dispenser of medicines to keep an account of the hundreds of petty

details of his shop laboratory, so as to exhibit results fit for a revenue collector to examine, is an imposition so onerous and burthensome in its execution as to be unworthy the character of a free government, and calculated to have a mischievous tendency in disgusting well disposed citizens with the whole scheme of collecting the revenue.

Every good citizen should cheerfully do his part towards upholding the national credit, by contributing his quota of taxation; but he should not submit to the unequal distribution of the burthen without a protest. The amount of ingenuity displayed by the Committee of Ways and Means in getting up the revenue laws was quite remarkable, but in the hands of the executive officers this ingenuity has blossomed and fructified nowhere so precociously as in its relations to those wants of the community served by the apothecary. The idea seems to have been adopted that, under the fear of sickness or death, any amount of taxation may be wrung out of the people through the apothecary. We are reminded by it of Satan's answer in reference to Job: "Skin for skin; yea, all that a man hath will he give for his life;" and there is more truth than fiction in the worldly policy that dictates it.

The influence of the immense impost on alcohol (\$4.00 per gallon,) reaches nearly every important class of preparations made by the apothecary, and yields of itself a sufficient revenue to be drawn from this branch of business; but pharmacy has to carry, 1st, the duties on drugs, nearly all of which are imported; 2d, the right to carry on the business, by license; 3d, the right to sell brandy, whisky, and wine, for medicinal use, requires another license, although they are all officinal medicines; 4th, the stamp tax, which is a considerable item; 5th, the income tax,—and now, lastly, a manufacturer's tax! In a word, he pays a license for the right of carrying on the business, and is then taxed for doing it! Fortunately, most of these incongruities arise from the imperfect digestion of the revenue laws, and want of experience in the officials. We have recently had occasion to converse with one of the Assessors,—a man of intelligence,—who, while he does his duty to the government, is guided rather by the spirit than the letter of the law. He admits the practical difficulty of applying the rule to the legitimate apothecary, and believed that it would reach him solely where he stepped aside from his business of preparing and dispensing medicines for the sick.

ST. LOUIS COLLEGE OF PHARMACY.—We have received from the authorities of this Institution, in pamphlet form, copies of its "Charter, Laws and Code of Ethics," and a prospectus of the first annual course of instruction in that College. We have already alluded to the reorganization of the St. Louis College of Pharmacy, and it is with great pleasure this tangible evidence of the progress of the work has been received. From a glance over the pamphlets it is quite evident that the authorities issuing them have approved of the general plan and code of ethics of our College and School,

as in many respects they are very similar. In the St. Louis School, however, they are in advance of us, having a chair of Botany—a feature not yet adopted into our School. The greater tendency to the use of vegetable remedies in the West, and the great variety of valuable indigenous plants that are found all over the country, render this Chair especially important. We hope Prof. Wadgymar will have a good class this season, and realize for the School and for himself substantial advantages.

THE BRITISH MEDICAL COUNCIL, THE PHARMACY BILLS, AND THE BRITISH PHARMACOPÆIA.—Many of our readers are aware that for some time past the Chemists and Druggists of England and Wales on the one hand, and the Council of the Pharmaceutical Society of Great Britain on the other, have originated Parliamentary Bills for the better regulation of pharmacy, so as to register all persons who shall engage in the practice of pharmacy after January 1, 1866, intended to include that numerous class of dispensers who are outside of the Pharmaceutical Society. Pending the consideration of these Bills by the Committee of Parliament having them in charge, the attention of the Medical Council has been attracted to the subject, and, at their meeting held April 7th, appointed a committee, of which Dr. Henry W. Acland was *Chairman*. The committee, after considering both bills, prefers the mode of action suggested in the bill of the Pharmaceutical Society, as best calculated to attain the end in view,—viz., “to form a Register of legally qualified pharmaceutical chemists; to prohibit the use of certain pharmaceutical titles by persons not on the register; to confine to those registered the privilege of executing the prescriptions of medical practitioners, subject to the provisions hereinafter named; but not to restrict the sale of medicines asked for in any other manner.”

The Committee suggest certain additions to the Pharmacy Bill: 1. That it should apply to Ireland also; 2, that it should be rendered imperative on pharmaceuticalists to follow the British Pharmacopœia in compounding prescriptions, unless otherwise directed by the prescriber; 3, they think the terms of registration too easy; 4, they advise that a clause should be inserted in the bill prohibiting pharmaceuticalists of all grades from practising medicine or surgery, or any branch of medicine or surgery.

At the meeting of the Medical Council, April 13th, an extended discussion followed the reading of a resolution by Dr. Corrigan, to cause to be inserted in the Pharmacy Bill a clause to render it imperative on dispensers to follow the British Pharmacopœia, unless specially otherwise directed, which, in a modified form, the Council adopted so far as to send such recommendation to the Secretary of State.

On the 15th of April, the Pharmacopœia Committee reported to the Medical Council as follows:

“The Pharmacopœia Committee beg to report, that after much careful consideration they requested Mr. Warrington, of the Apothecaries’ Hall, and Dr. Redwood, of the Pharmaceutical Society, to undertake the prepa-

ration of the next edition of the Pharmacopœia, under the supervision of the Committee. The gentlemen named accepted the duty, and they are engaged actively in its performance. The Committee in the first instance prepared an outline of the subjects which seemed to them to require revision, and these subjects are made the basis of careful inquiries by Messrs. Warrington and Redwood, who have submitted and will continue to submit their reports thereon, together with such suggestions as they think proper to make, for the consideration and decision of the Committee. The Committee have also received valuable assistance from Dr. Farre, appointed by the English Branch Council, from Dr. Moore, appointed by the Irish Branch Council, and from Dr. Christison, appointed by the Scottish Branch Council, to report on the improvement in the progress of pharmacy; and they hope that the services of these gentlemen may be continued.

"Taking the first edition of the Pharmacopœia as a basis, compiled, as it has been, with great labor and expense, the Committee hope that, without making any very extensive or fundamental changes, the next edition will be found acceptable to the profession.

GEORGE BURROWS, M. D., *Chairman.*"

The report was adopted after some discussion, and it was hoped that it would be printed in time for submission to the next meeting of the Council.

This early revision of the British Pharmacopœia is caused by the numerous criticisms it has received at the hands of both physicians and pharmaceutists; and in the hands of Mr. Warrington and Dr. Redwood, both practical men, we may look for many improvements.

BRITISH PHARMACEUTICAL CONFERENCE.—This body will meet in September, in the city of Birmingham. The Pharmaceutical Journal for June contains a list of the subjects of queries which are expected to be answered on that occasion, about fifty in number. They are well gotten up, and, if answered in a manner equal to that of the last meeting, they will prove to be valuable contributions to the general stock. We look upon this enterprise as one of the best that has yet been undertaken for the advancement of British pharmaceutists; it does not clash with the *Institutions*, and affords a stimulation to laudable ambition to excel in every department of pharmacy. May success attend it.

Resources of the Southern Fields and Forests; Medical, Economical and Agricultural: being also a Medical Botany of the Confederate States: with practical information on the useful properties of the trees, plants and shrubs. By FRANCIS PEYRE PORCHER, Surgeon P. A. C. S. Prepared and published by order of the Surgeon-General, Richmond, Va. Charleston: 1863, pp. 601, octavo.

This volume, kindly sent to us by Mr. Edwin T. Robinson, of Richmond, Virginia, appears to have been compiled by the author to meet, as far as possible, the medical wants caused by the rigorous blockade during the

last two years of the Rebellion. The author remarks, "It is intended as a repertory of scientific and popular knowledge as regards the medicinal, economical and useful properties of trees, plants and shrubs found within the limits of the Confederate States, whether employed in the arts for manufacturing purposes, or in domestic economy to supply a present as well as a future want. Treating specially of our medicinal plants, and of the best substitutes for foreign articles of vegetable origin, my aim has been to spare no exertions compatible with the limits assigned me to make it applicable as well to the requirements of the surgeon as of the planter and farmer; and I trust that, after the war shall have ceased, there shall still be no diminution in the desire of every one to possess a source from whence his curiosity may be satisfied on matters pertaining to our useful plants."

The author has availed himself freely of the botanical and medical works of the United States published before the rebellion, as well as of the journals and Patent Office reports. The arrangement is that of the natural orders of plants, the author bringing in important subjects under the plant that most concerns them—as wine under the grape, sugar under sorghum, &c. For the purposes for which it was written a much smaller book, less technical and more practical, would probably have proved much more useful. As a memento of the extraordinary condition of the country requiring its publication this volume is interesting. It is well printed on tolerably good paper, and is altogether a creditable specimen of Confederate work. Not the least curious feature of the book is a pamphlet glued in the forepart, entitled, "Standard supply table of the indigenous remedies for field service and the sick in general hospitals, 1863," issued from the "Surgeon-General's Office," Richmond, Va., and signed "S. P. Moore, Surgeon-General C. S. A." The tables give the amounts of indigenous herbs, roots, barks, etc., required to serve 500 men for 12 months.

The Essentials of Materia Medica and Therapeutics. By Alfred Baring Garrod, M. D., F. R. S., Prof. of Materia Medica at King's College, London, &c. &c. New York: William Wood & Co., 61 Walker St. 1865. Pp. 439, octavo. (From the publishers.)

This volume is the result of an attempt to select what the author deems to be the parts of *materia medica* and *therapeutics* most essential to the student and practitioner, to the exclusion of most of the bulky details which swell the size of the standard works, such as botanical and other scientific descriptions, references to authorities, pharmaceutical comments, etc. Books of this kind owe their usefulness in great measure to the accuracy and clearness with which facts are stated, by the careful use of terms expressing size, shape, color, odor, taste, measure, weight, specific gravity, solubility, volatility and composition by symbols. It is surprising how much advantage an author gains by attention to these points in

compressing knowledge into a small volume. Judged by this standard, Dr. Garrod's book compares well with any of its class that we have examined. The author is evidently master of his subject, and handles it very well. He gives a few pages of introductory comments on pharmaceutical preparations, weights and measures, then three-eighths of his space to inorganic substances, and the remainder to organic drugs and preparations, under the two heads, Vegetable Kingdom and Animal Kingdom. The arrangement is according to the natural system in each case, giving the preparations of each drug under its description, and though generally very brief, in some of the more important drugs, as cinchona, opium, digitalis, &c., more detail is permitted. The work is evidently intended more for the medical student and practitioner than for the pharmacist. The therapeutical part of the book, including the statement of doses, is brought under the same rule as the *materia medica*—most space and comment being given to the important drugs. On the whole, we believe this book is the best of its kind that has issued from the press, and will be found highly useful to the student and practitioner of medicine as well as to the apothecary. In passing through the American press several formulæ and a few notices of American drugs have been introduced, but many of value are omitted; nor has as much accuracy been exhibited as would have been desirable in some of them.

OBITUARY.

THOMAS B. WILSON.—The scientific world has sustained a severe loss in the death of Dr. Thos. B. Wilson, the late President of the Academy of Natural Sciences, in this city, which took place on the 15th of March last, at his late residence in Newark, Delaware. Dr. Wilson, who was a native of Philadelphia, has for many years devoted himself to the encouragement and promotion of zoological science, especially in connection with the Academy of Natural Sciences, an institution which, mainly by his energy, ability and princely liberality, has been raised from comparative mediocrity to an equality with the leading kindred institutions of the Old World. The superb collection of Birds, which ranks as the third in importance in the world, and the invaluable Library of the Academy, are but a partial evidence of Dr. Wilson's unostentatious munificence. Every department of the institution bears his mark and will feel his loss. He has also contributed largely of late to the Entomological Society at Philadelphia. Although his residence had been removed to Newark, Delaware, half of his time was regularly spent in his native city and occupied with his favorite pursuits. It is difficult to estimate the value of such men to the cause of science, or the loss which a community sustains when their labors are cut short.—*Daily Evening Bulletin*, Philadelphia, March 21.